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AMERICAN CYCLOPÆDIA.

VOL. XV.

SPIRITUALISM–UZZIAH.

THE NEW

AMERICAN CYCLOPÆDIA:

A

Popular Dictionary

OF

GENERAL KNOWLEDGE.

EDITED BY

GEORGE RIPLEY AND CHARLES A. DANA.

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THE
NEW AMERICAN CYCLOPÆDIA.

SPIRITUALISM, a term formerly used to designate the doctrines and religious life of a class of mystics who professed to be under the sensible guidance of the Divine Spirit, and who were distinguished by a habit of spiritualizing the Sacred Scriptures. Jacob Böhme, Mme. Guyon, Miguel de Molinos, and Mme. de Bourignon, though not all ostensibly of the same communion, are representatives of the somewhat numerous class of religionists, particularly of the 17th century, to whose teachings and practice the appellation of spiritualism has been applied. Latterly, however, especially in the United States, the word has been employed exclusively to designate the belief in and practice of open intercourse with the spiritual world. This alleged intercourse has attained an extraordinary development in recent times, and especially since about the year 1848. Although it was not until that period that the so called spiritual manifestations assumed a form and conspicuousness which forced them into universal notice, it is asserted that many startling instances of them, as precursors and prophets of the more signal wonders, had been in the course of development during many years previous; and that, in fact, the spiritualism of the day is the growth of a century. We are referred to the alleged fact that 100 years ago Emanuel Swedenborg was in full and open communication with the spiritual world, and in daily converse with spirits and angels, with all the familiarity with which man converses with man. There is also a tradition that while Swedenborg was on his deathbed, he was asked by a friend whether in that solemn hour he still adhered to the statements and doctrines set forth in his books; when he answered emphatically in the affirmative, adding that in about 80 years from that time events would occur that would greatly tend to bring his teachings into general notice. It is noted by spiritualists as a singular coincidence that the 80 years from that time (1772) expired in 1852, at which time the alleged spiritual phenomena, corroborating in many respects what Swedenborg had taught concerning spirits and the spiritual world, were exciting universal attention. In his book on "Divine Love and Wisdom" (paragragh 257) Swedenborg avers that a man in whom the spiritual degree of the mind is open may come into angelic wisdom "by laying asleep the sensations of the body, and by influx from above at the same time into the spirituals of his mind."—Clairvoyance appears to have played an important part in the introduction of modern spiritualism, and a historical sketch of the latter, to be complete, must include some notice of the former. Jung-Stilling, in his various writings on pneumatology early in the present century, appears to have been the first to notice that clairvoyants, during their more exalted states of *ecstasis*, professed, with what seemed to him satisfactory evidence, to be in converse with invisible intelligences. The same claims to open intercourse with the spiritual world, with many phenomenal evidences which he regarded as establishing their truth, were afterward noted by Dr. Justinus Kerner, and detailed at large in his biography of one of his patients, Frederica Hauffe, more familiarly known as the seeress of Prevorst, and who is said to have been in a magnetic state for most of the time during the last 7 years of her life, describing the persons and repeating the language of what she represented to be spirits, and being often accompanied with mysterious rapping sounds. Many similar instances of alleged intercourse with the invisible world through clairvoyance subsequently occurred, not only in Germany and other parts of Europe, but in the United States; but none of these phenomena were of so remarkable a character as those presented in the case of Andrew Jackson Davis. (See DAVIS, ANDREW JACKSON.) Thrown into an abnormal state of mind and body by the process of magnetism, this young man, while professing to be in immediate converse with the spiritual world, dictated a large 8vo. volume which was published under the title of "The Principles of Nature, her Divine Revelations, and a Voice to Mankind." In a portion of this book that was dictated in the autumn of 1846 (pp. 675–'6) the entranced author distinctly predicted that the communication with the spiritual world would ere long assume "the form of a living demonstration." The same prediction is said to have been frequently repeated by the young clairvoyant in his interviews with his visitors. Another event is spoken of as possessing some significance in connection with this history. In the spring of 1843, the societies of Shakers at New Lebanon and Watervliet, N. Y., and several other communities of that fraternity, almost simultaneously became the subjects of strange psychological experiences, during which certain of the members would lose all personal consciousness, while influences purporting to be the spirits of persons of different nations, and who had lived in the world in different ages, took possession of their bodies, and spoke through their vocal organs. Shakers who personally witnessed these phenomena describe them as being very impressive, and a constant burden of their communications was: "Treasure these things up in your hearts; say nothing of them, for the present, to the world's people, but the time is not far distant when these same wonders which you now behold shall be witnessed extensively in the world." These manifestations continued for a year or more, when they suddenly ceased, the alleged spirits bidding the "brethren" farewell, with a promise to come again before many years, when their manifestations should be addressed not merely to a select few, but to the world in general.—The commencement of the "spirit-rapping" phenomenon was as follows: Some time in the year 1847 the attention of Mr. Michael Weekman, who resided in the little village of Hydesville in the township of Arcadia, Wayne co., N. Y., was called to certain rapping sounds upon the door of his house, which he was unable by the most diligent efforts to trace to any visible cause. Mr. Weekman soon afterward vacated the house, and the family of Mr. John D. Fox moved into it. In the latter part of March, 1848, this family was startled by mysterious rappings that were heard nightly upon the floor of one of the bedrooms, and sometimes in other parts of the house. They endeavored to trace the sounds to their cause, but failed. On the night of March 31, having been broken of their rest for several nights previous, they retired to bed earlier than usual, hoping to be permitted to sleep without disturbance. The sounds, however, were resumed, and, occurring near the bed occupied by two of the daughters, the youngest girl, then about 10 years old, attempted to imitate them by the snapping of her fingers. Whenever she would snap her fingers, the raps would immediately respond by the same number of sounds. One of the girls then said: "Now do as I do; count 1, 2, 3, 4, 5, 6," at the same time striking her hands together. The same number of raps responded, and at similar intervals. The mother of the girls then said: "Count 10;" and 10 distinct raps were heard; "Count 15," and that number of sounds followed. She then said: "Tell us the age of Cathy [the youngest daughter] by rapping one for each year," and the number of years was rapped correctly. Then, in like manner, the age of each of the other children was by request indicated by this invisible agent. Startled and somewhat alarmed at these manifestations of intelligence, Mrs. Fox asked if it was a human being that was making that noise, and if it was to manifest it by making the same noise. There was no sound. She then said: "If you are a spirit, make two distinct sounds." Two raps were accordingly heard. The members of the family by this time had all left their beds, and the house was again thoroughly searched, as it had been before, but without discovering any thing that could explain the mystery; and after a few more questions, and responses by raps, the neighbors were called in to assist in further efforts to trace the phenomenon to its cause; but these persons were no more successful than the family had been, and they confessed themselves thoroughly confounded. For several subsequent days the village was in a turmoil of excitement, and multitudes visited the house, heard the raps, and interrogated the apparent intelligence which controlled them, but without obtaining any clue to the discovery of the agent, further than its own persistent declaration that it was a spirit. About 3 weeks after these occurrences, David, a son of Mr. and Mrs. Fox, went alone into the cellar where the raps were then being heard, and said: "If you are the spirit of a human being, who once lived on the earth, can you rap to the letters that will spell your name? and if so, rap now 3 times." Three raps were promptly given, and David proceeded to call the alphabet, writing down the letters as they were indicated, and the result was the name "Charles B. Rosma," a name quite unknown to the family, and which they were afterward unable to trace. The statement was in like manner obtained from the invisible intelligence, that he was the spirit of a peddler who had been murdered in that house some years previous. At first, we are told, the raps occurred in the house even when all the members of the family were absent, but subsequently they occurred only in the presence of the two younger daughters, Catharine and Margaretta. Soon after these occurrences the family removed to Rochester, at which place the manifestations still accompanied them; and here it was discovered, by the rappings at the letters of the alphabet in the manner before described, that different spirits were apparently using this channel of communication, and that in short almost any one, on coming into the presence of the two girls, could get a communication from what purported to be the spirits of his departed friends, the same often being accompanied by tests which satisfied the interrogator as to the spirit's identity. A new phenomenon was also observed in the frequent movement of tables and other ponderable bodies without appreciable agency, in the presence of these two young girls. These manifestations, growing more and more remarkable, attracted numerous visitors, some from long distances, and the phenomenon began, as it were, to propagate itself, and to be witnessed in other families in Rochester and vicinity, while, as coincident therewith, susceptible persons would sometimes fall into apparent trances, and become clairvoyant, and reaffirm these raps and physical movements to be the productions of spirits. In Nov. 1849, at the request of the alleged spirits, a public meeting was called in Corinthian hall, Rochester, for the purpose of submitting these phenomena to the investigation of a committee to be appointed by the audience, with a view to the publication of a report concerning their nature and claims, whatever the decision respecting these might be. The Misses Fox appeared upon the stage, the phenomena were freely manifested and were subjected to many tests, and a committee appointed for their investigation, after having continued their experiments there and elsewhere for several days, reported that they were unable to trace them to any mundane agency. From that time, and especially from the time the Fox girls arrived in New York city in the following month of May, the alleged spiritual manifestations became the subject of extensive newspaper and conversational discussion; their facts were published far and wide; "mediums," through whom they were said to occur, sprang up in different parts of the country, and were multiplied by hundreds and almost by thousands; and for several years spiritualism constituted one of the most prominent themes of public discussion. Among the mediums of the alleged spiritual manifestations there have been representatives from all classes and conditions of mankind, male and female, high and low, rich and poor, learned and unlearned; and even little children in their swaddling clothes are said to have been, in some few instances, mediums for the raps. The alleged mediums have been classified as rapping mediums; mediums for tipping and turning tables by a slight touch of the finger; mediums for the movement of ponderable bodies without contact; mediums for the production of phosphorescent lights in a dark room; mediums for playing on musical instruments in a manner beyond their ordinary abilities; mediums for involuntary writing; impressional speaking, seeing, hearing, personating, and healing mediums; mediums in whose presence are produced drawings, and pictures in colors, and writings, and also in many instances tangible and visible living human forms; and mediums for the development of other mediums. By the raps and tipping of tables, and by the control of the medium's organs to write and speak, the spirits are supposed to express their own peculiar intelligence in a degree of perfection proportioned to the development and passivity of the medium; and it is averred that persons while under the spiritual afflatus have often spoken in foreign tongues which they had never learned; and writings in languages to them unknown have, in a few instances, been produced in their presence, as we are told, by invisible hands. Mediums for the movement of ponderable bodies without hands, are said to be sometimes also mediums for the preternatural movement of their own bodies; and intelligent and respectable persons testify that they have seen the medium Henry Gordon float in air several feet above the floor, for several minutes, without the slightest physical contact or support, he being at the time deeply entranced. Individuals long deceased, it is said, have often been personated by mediums so that their surviving friends would instantly recognize them, and their earthly history has been accurately detailed, though the mediums may never have known nor heard of them. Persons report that the spirits of their departed friends have been seen and correctly described, and their words repeated, though to all but the medium they were invisible and inaudible; and obstinate diseases, on which the skill of the physician has been exhausted in vain, are said to have been quickly cured simply by the imposition of the hands of the medium while under spirit influence. Spiritualists admit that many impositions have been practised under the name of spiritual manifestations, but they aver that in most instances cheats could not have been palmed off even if designed, and that in other cases there could be no possible motive for deception, as the investigations were carried on in private families, while the mediums were their own sons and daughters. The "Spiritual Register" for 1859 estimates the number of actual spiritualists in America at 1,500,000; those who have more or less faith in the doctrine, but do not openly espouse it, 4,000,000; public advocates, 1,000; mediums, public and private, 40,000; places for public meetings, 1,000; books and pamphlets, 500; periodicals, 30. Spiritualists, however, are not associated under any regular organization, but have their representatives among all sects and parties of religionists and non-religionists, and these estimates of their numbers can be considered as only approximately correct.—Spiritualism numbers among its avowed converts in America many persons well known in the walks of science, philosophy, literature, and statesmanship. While it has its converts from every religious denomination, no small proportion of its advocates are from the ranks of those who previously doubted or totally disbelieved the immortality of the soul, and who affirm that they carry their sceptical tendencies into the investigation of this subject. On matters of speculative theology, there seems to be among them the widest latitude of opinion, though a majority of them perhaps are in their speculations inclined to what may be termed a sublimated naturalism. They tell us that it is not the object of the spirits to teach theological dogmas as by any authority superior to that of man, but rather, by the mental and physical phenomena incidentally presented in the course of their manifestations, to furnish those elements of reasoning from which each one may work out his own conclusions; while we are told that the main object of their manifestations is to furnish actual demonstration of the immortality of the soul and of some of the conditions and laws of the *post mortem* existence.—Spiritualism has also made considerable progress in Europe, especially in England and France. In England, it is stated, many of the nobility as well as of the intelligent middle classes are believers in it, and hold communications with their departed friends through mediums in their own families. Several books and pamphlets have been published on the subject in that country, and a semi-monthly periodical is issued in London devoted to its facts and philosophy. In France its believers are still more numerous. Several able journals devoted to the subject are published in Paris, and read throughout France, Switzerland, and Belgium. Germany, Spain, Italy, Russia, and in short nearly every nation of Europe, appears to have its devotees of spiritualism, in greater or smaller numbers. Travellers in the north of Africa tell us that it has made considerable progress in the Barbary states; and reports from China represent it as having very distinctly appeared at several localities within that empire, and especially at the city of Shanghai, about the time of its first advent in America.—For specimens of the better kind of spirit communications, considered as literary productions, see "Spiritualism," by the Hon. John W. Edmonds and G. T. Dexter, M.D. (2 vols. 8vo., New York, 1854–'5); "The Healing of the Nations," by Charles Linton, with introduction and appendix by N. P. Tallmadge, late U. S. senator and governor of Wisconsin (8vo., New York, 1855); "Scenes in the Spirit World, or Life in the Spheres," by Hudson Tuttle, medium (12mo., New York, 1855). Among books produced in the ordinary manner, the following may be consulted: "Experimental Investigations of the Spirit Manifestations," by Prof. Robert Hare (8vo., New York, 1856); "A Discussion of the Facts and Philosophy of Ancient and Modern Spiritualism," by S. B. Brittan and B. W. Richmond, M.D.; "Modern Spiritualism, its Facts and Fanaticisms," &c., by E. W. Capron (8vo., Boston, 1855). With the exception of these and a few other books, the best portion of the literature of spiritualism is to be found in the various periodical publications devoted to that subject.

SPITZBERGEN, a group of 4 principal and several smaller islands in the Arctic ocean, the northernmost land yet discovered, between lat. 76° 30′ and 80° 30′ N. and long. 9° and 22° E., and about midway between Greenland on the W. and Nova Zembla on the E.; area, about 22,000 sq. m. The large islands are Spitzbergen, North-East Land, South-East Land, and Charles. On the E. of Spitzbergen proper is a peninsula called New Friesland or East Spitzbergen. The island is very mountainous, some of the peaks rising to the height of 3,000 or 4,000 feet above the level of the sea. On Charles island are 5 summits ranging from 4,000 to 4,500 feet high. The N. shores of Spitzbergen and North-East Land are more level, and here and on several of the smaller islands some soil is found, in which a few very diminutive plants spring up and mature in a month or 6 weeks of the short summer. Immense glaciers abound, and the islands are almost covered with perpetual snow. The mean temperature of the 3 warmest months is 34.5°. For 4 months of the year the sun does not rise, but the long night is relieved by a faint twilight, and the occasional brilliant light of the aurora borealis; the moon and stars also shine here with great brightness. The islands are frequented by great multitudes of sea fowl, as well as by polar bears, foxes, and reindeer. Marble and coal of a good quality are found. The neighboring seas abound with whales, seals, and walruses, which are taken in large numbers by the vessels that visit this inhospitable region; and Russian whalers have lived for years on the islands.—These islands are supposed to have been first discovered by Willoughby in 1553; but their discovery is generally dated from the visit of Barentz, the Dutch navigator, in 1596, in his search for a N. E. passage to the Pacific, who named the principal island Spitzbergen (pointed mountains) from its numerous sharp peaks. Their sovereignty is claimed by Russia. A Swedish scientific expedition under Prof. Torell explored Spitzbergen in the summer of 1861, whose report is expected to form an important addition to the previous knowledge of that region.

SPLEEN (Gr. σπλην), the largest of the vascular or ductless glands, whose probable functional office is subsidiary to the process of sanguification. It is situated in the left hypochondriac region, below the diaphragm, above the descending colon, between the cartilages of the false ribs and the cardiac extremity of the stomach, to which it is united by short vessels. It is in health from 3¼ to 4½ inches long and 2½ thick, of an elongated flattened form, and about 7 oz. in weight; on the inner surface is a longitudinal groove in which are situated the blood vessels, posteriorly resting on the vertebral column; below it is in relation with the left kidney and capsule, and with the pancreas behind. It is soft, spongy, and dusky red; the external surface is covered with the peritoneum; beneath this is a coat of white fibrous tissue with some elastic fibres, from the inner surface of which extends through the entire organ a network of fibrous bands and threads, the trabecular tissue. The splenic artery comes from the cœliac axis, the trunks not anastomosing, but subdividing like the branches of a tree, to which the Malpighian corpuscles are attached as fruits on short peduncles, ending generally in capillaries with very thin walls, passing in every direction through the organ and into the interior of the corpuscles; but in man, according to Mr. Gray, the capillaries frequently disappear, and the blood passes from arteries to veins through *lacunæ* or mere channels in the pulp tissue. The veins are branched like the arteries, have no valves, and the principal stem is one of the trunks of the vena portæ; the nerves form the splenic plexus, and proceed from the solar plexus; the lymphatics are few and superficial. The parenchyma consists of a homogeneous mass of colorless nucleated corpuscles and cells imbedded in a granular plasma, in various stages of rapid development and change; this is in the greatest quantity toward the end of the digestive process, when a large amount of fresh alimentary material is introduced into the circulation. The splenic corpuscles, or Malpighian bodies of the spleen, are whitish spherical bodies, varying in diameter from $\frac{1}{6}$ to $\frac{1}{3}$ of a line, largest and most numerous in healthy and well fed individuals and animals. There are colored cells in the spleen pulp, chiefly red blood corpuscles in various stages of degeneration, and a few pigment cells. It is proportionately the largest and most active in early and vigorous manhood; it is found in all classes of vertebrates, and of various shapes and sizes. The great amount of blood sent to the spleen, its minute distribution, and the contents of the glandular vesicles, show that cell growth proceeds rapidly in its substance; their products, however, are returned in an altered state to the blood, passing through the liver before entering the vena cava. It is probably a storehouse of albuminous nutritive material for the formative operations, which may be drawn upon as the system requires it, and with the absorbent glands probably assists in supplying the germs of the blood corpuscles. It is also generally believed to serve as an organ for the relief of the portal circulation, preventing undue accumulation of blood in the liver by the ease with which its vessels are distended. Obstruction of the circulation in the liver affects the spleen directly; when the alimentary canal is distended with food, were it not for the spleen the portal system would be gorged with blood; the general internal venous congestion which results from the cold stage of intermittent fever, it is well known, causes a permanent enlargement of the spleen. Its presence is not essential to life, at least in the adult; it has often been removed in animals, and in a few instances in man, without apparent ill consequences, its functions probably being performed by the other ductless or even the lymphatic glands. (See GLAND.) Almost every one has experienced a sharp pain or stitch under the ribs of the left side, after violent or long continued running and active exercise; this is caused by distention of the spleen by the blood obstructed in its passage through the liver; a similar pain is felt in the cold stage of fever and ague. It is sometimes greatly enlarged, as in the last mentioned disease and in typhoid fever, and it is engorged and softened in scurvy; in its chronic diseases, the face is apt to assume a dull ashy white color, seen also in the eyes; it is subject to inflammation, generally from external injury, with pain, tenderness on pressure, and fever, requiring antiphlogistic treatment. The spleen was by the ancients supposed to be the source of black bile, which predisposed to and produced the melancholy temperament; and the terms "spleen" and "splenetic" are to this day employed to describe the ill-natured, fretful, and desponding state of mind commonly called "the blues;" it is hardly necessary to say that there is no connection between the spleen and the above temperament.

SPOHR, LUDWIG, a German composer, born in Brunswick, April 5, 1784, died there, Oct. 22, 1859. In early youth he devoted much attention to the study of the violin, his skill in performing on which, when practically tested at the congress of Vienna in 1814, was declared superior to that of any of his rivals. Subsequently he gave concerts for several years in various parts of Europe, and in 1822 established himself in Cassel as chapelmaster of the elector, in whose service he remained until near the close of his life. He produced a great number of orchestral symphonies, concertos, quartets, and other instrumental works, and cantatas, songs, ballads, and other vocal pieces, which are popular throughout Germany; but his reputation rests chiefly on his operas, "The Mountain Spirit," "The Alchemist," "The Crusaders," "Jessonda," "Faust," "Zemira and Azor," and "Pietro of Abano;" and on his oratorios, "The Last Judgment," "The Crucifixion," and "The Fall of Babylon," which are among the finest works of their class produced since the time of Handel. His symphony entitled "The Consecration of Tones" is also a great favorite in the concert room. Forty years before his death he discontinued performing on the violin, but left to violin players an admirable treatise on the subject, entitled "The Violin School." During the latter years of his life he composed little.

SPOLETO, formerly a delegation of the Papal States, now belonging to the kingdom of Italy, bordering on the Neapolitan territory; area, 1,130 sq. m.; pop. in 1853, 134,939. It is drained by the rivers Tronto, Tiber, Nera, Corno, and Velino. The valley of Spoleto is very fertile, and produces large quantities of maize, wine, olives, melons, and silk. Under the new organization Spoleto is a district of reduced size in the province of Umbria; pop. 70,011.—SPOLETO (anc. *Spoletium* or *Spoletum*), the capital, is situated on the side of a mountain overlooking the Tessino, about 75 m. N. from Rome; pop. about 7,000. It is defended by a strong castle, which is separated from the city by a very deep and narrow ravine crossed by a single bridge of great height. The city has a fine cathedral of marble, in the style of the early *renaissance*. Among its numerous ruins are those of an ancient theatre, of a temple of Concord, and a palace of Theodoric. There is also an old aqueduct attributed to the

Romans, and a triumphal arch called the "gate of Hannibal." The town has considerable trade in grain, wine, raisins, leather, and horses. Under the Romans Spoletium was a flourishing town of the province of Umbria. Hannibal was repulsed under its walls. After the fall of the western empire it fell into the power of the Goths, was taken from them by Narses, subsequently became the capital of a Lombard duchy, and in the 13th century was annexed to the Papal dominions. It was sacked by Frederic Barbarossa, and again destroyed by the Perugians in 1324. Napoleon I. made it the capital of the department of Trasimène. It has suffered much from earthquakes.

SPONDEE (Gr. σπονδη, a libation), a poetical foot of 2 long syllables. Verses exclusively spondaic have a slow movement, and consequent solemnity; such were sung by the Greeks on sacrificial occasions, and when a libation was offered, and hence the name. The spondee is used in any part of the English heroic line, but with the best effect in the first and last places.

SPONGE, the familiar name of the family of *spongiadæ* or *porifera*, a division of animals of the so called class *protozoa*. It has long been a disputed point whether sponges are animals or vegetables; in the "Principles of Zoology," by Agassiz and Gould (1848), they are said to belong to the vegetable kingdom; the most recent authorities, as Johnston and Bowerbank, decide in favor of their animal nature. Whatever may be the decision of this question, the common sponge (*spongia*, Linn.) may be taken as the type. These consist of a soft gelatinous mass, porous and elastic, supported on a fibro-corneous skeleton which anastomoses in all directions, and without silicious or calcareous spicula; they have no organs nor vessels, are capable of absorbing great quantities of fluid which is given out again on pressure, insensible to all kinds of irritation, and incapable of contraction or locomotion. The apparently homogeneous jelly which fills the pores of the living sponge and covers its surface, is seen under the microscope to be filled with numerous transparent spherical granules. There is a gradual passage from the soft sponges of commerce to those of stiff and compact texture, with the fibres loaded with silicious spicula, crumbling easily when dry, and useless in the arts; others are rather of a felted character, usually grayish white, and loaded with variously shaped spicula of carbonate of lime. Sponges vary much in form, and are fixed by a kind of root at the base, or incrust other bodies, growing mostly in groups; most are marine, but *spongilla* (Lam.) grows in fresh water; they often possess brilliant colors. Rounded orifices of large size, or *oscula*, are scattered over the surface of most sponges, which lead into sinuous canals permeating the substance in every direction; water is continually absorbed by the pores of the sponge, penetrating and filling every part, and, having supplied air and food, is driven out through the oscula; the currents are kept up principally by the action of minute vibratile cilia, assisted, according to Dutrochet, by the act of endosmosis. Sponges are propagated sometimes by ciliated gemmules, yellowish and oval, arising from the organic mucus, and carried out of the substance by the currents; they are mostly formed in the spring, and, after swimming freely about for some time, become fixed and grow. They also produce internal, unciliated, oviform bodies, resembling winter ova, which, when thrown out, swell, burst, and give issue to the locomotive germs within; they are said also to grow by division, or growth of detached portions of the parent body; they are believed to be nourished by minute algæ drawn within their pores. Some live in shallow, others in very deep water; scarce and small in cold latitudes, they increase in size and number toward the tropics, being most abundant in the Australian seas. The sponges of commerce are procured chiefly in the Mediterranean and the Bahama islands; they are obtained mostly by diving, to which persons are trained from childhood in the Greek islands; the adhesion is generally firm to the bottom, and the growth slow; the lime is removed by soaking in dilute muriatic acid, and they are then bleached and beaten for market. To bleach sponges, the finest and softest are selected, washed several times in water, and immersed in very dilute hydrochloric acid to dissolve out the calcareous matters; having been again washed, they are placed in another bath of dilute hydrochloric acid to which 6 per cent. of hyposulphite of soda dissolved in a little warm water has been added; the sponge is left in this bath 24 hours, or until it is bleached as white as snow. Smyrna is the chief place for the export of fine sponges. The coarse sponges used for horses and carriages, &c., are obtained chiefly from the Bahamas; when taken from the water they have a sickish, disagreeable odor, which soon becomes putrefactive and disgusting, like decomposing animal rather than vegetable matter; they are first buried in dry sand, and when decomposition has ceased are exposed in wire cages to the action of the tide for purification. According to Dr. Bowerbank, there are 24 genera of sponges on the shores of Great Britain. While *spongia* is the type of the corneous sponges, *thethys* (Cuv.) and *Grantia* (Flem.) are types of the silicious and calcareous sponges respectively. (See Protozoa.)

SPONSOR. See Godfathers and Godmothers.

SPONTANEOUS COMBUSTION. See Combustion, Spontaneous.

SPONTINI, Gasparo, an Italian composer, born in Jesi, in the Papal States, Nov. 17, 1778, died in Majolati, near Jesi, Jan. 14, 1851. He studied under Padre Martini at Bologna, and at 13 became a pupil of the conservatory La Pieta at Naples. At 17 he composed his first opera, *I puntigli delle donne*, which met with a decided success; and 9 years later he repaired to Paris, where were produced at the French opera his 3 most celebrated works, *La Vestale* (1807), *Fernand Cortès* (1809), and *Olympie* (1819). The first of these enjoyed the greatest reputation, and among the French Spontini was in his prime ranked as the equal of Rossini. Subsequently he was for a long time director of the opera at Berlin; but in the latter part of his life, passed partly in Italy and partly in Paris, he composed little.

SPOONBILL, the common name of the wading birds of the family *plataleidæ*, characterized by a much depressed bill, very broad, and dilated at the end in the shape of a rounded spoon. In the genus *platalea* (Linn.) the bill is long, straight, thin, slightly bent downward at the tip, the mandibles in close opposition and the edges not lamellar; nostrils basal and in the lateral groove; wings long, 2d quill the longest; tail short; legs longer than in the typical waders, tibia bare for nearly one half; tarsi not much longer than middle toe, covered with small hexagonal scales; toes webbed at the base, the outer longer than the inner, the middle not pectinated, and the hind one only partly resting on the ground; claws short and obtuse. There are about a half dozen species, found in all quarters of the globe, migrating to warm climates at the approach of winter; they frequent marshy inlets of the sea, and the borders of lakes and rivers, wading about in search of fish fry, worms, frogs, and aquatic insects; they can swim, and even dive, if necessary for escape; the nest is made either on trees or among rushes in swampy places, and composed of coarse sticks; the eggs are 2 to 4, whitish. The roseate spoonbill (*P. ajaja*, Linn.) is about 30 inches long, and 4½ feet in alar extent; the bill is 7 inches, and covered with a soft skin; the head is of moderate size, bare, the skin yellowish green; the neck long and slender, and the body compact and muscular. The prevailing color is rosy red, paler in front, and nearly white on the neck; lesser wing coverts, upper and lower tail coverts, and lower part of throat, bright carmine; tail feathers ochrey yellow; the young have the head feathered, the carmine tint wanting, and the tail rosy. It is found in the southern Atlantic and gulf states, and is so abundant in the breeding season at Indian river, Florida, that one person has been known to kill 60 in a day; it does not go above North Carolina, nor far from the sea; being very sensitive to cold, it is most abundant in the gulf states. They are essentially nocturnal, though they often feed by day when the tide suits; they are fond of the company of herons; they fly with the neck and legs extended, and rise rapidly to a great height; they alight easily on trees, and can walk on the large branches. The breeding time in the Florida keys begins in February, the young being out of the nest by April 1; the nest is usually in the top of a mangrove, coarsely made; the eggs are commonly 3, elongated, 2½ by 1½ inches, white, sprinkled all over with bright rufous spots, forming a ring near the large end; they breed and are commonly seen in flocks. The flesh is oily and poor eating; the beautiful feathers of the wing are made into fans in Florida, those from a single bird being worth at St. Augustine from $1 to $1.50. The European spoonbill (*P. leucorodia*, Linn.) is about the same size, of a white color, with reddish yellow patch on breast, pale yellow naked space around eyes and throat, and a yellowish white, long occipital crest; it is rare in England, but common in Holland and the southern portions of the continent and all over Africa. This curious genus has affinities with the cormorants and pelicans in the dilatable and bare gular membrane, with the curlews and herons in the alimentary canal, and with the sandpipers in the shape of the sternum; the trachea divides before entering the chest.—The shoveller duck (*spatula clypeata*, Boie) is also called spoonbill.

SPORADES (Gr., the scattered), the lesser islands of the Grecian archipelago surrounding the group of the Cyclades, divided into the northern, western, and eastern Sporades. The northern group includes the islands of Skiatho (anc. Sciathus), Skopelo (Scopelos), Skyro (Scyros), and Kilidromi (Halonesus); these lie off the N. E. coast of Negropont or Eubœa, and belong to the kingdom of Greece. The western group, which also belongs to Greece, lies off the E. coast of Argolis, and includes Hydra (Hydrea), Spezzia (Tiparenus), Poros (Sphæria), Ægina, and Koluri (Salamis). The eastern group belongs to Turkey, and lies off the S. W. coast of Anatolia; it includes Psara or Ipsara (Psyra), Scio (Chios), Samos, Nicaria (Icarus or Icaria), Patmos, Lero (Leros), Kalymna (Calymna), Stanko (Cos), Stampalia (Astypalæa), Anaphe, Skarpanto (Carpathus), and Kaso (Casus). The Sporades of the ancients included only the eastern group, and this with the exception of the northernmost islands.

SPOTSWOOD, John, a Scottish prelate, born in Edinburghshire in 1565, died in London, Nov. 26, 1639. He was graduated at the university of Glasgow at the age of 16, and at 20 was appointed to succeed his father in Calder kirk. At first strenuous in his opposition to episcopacy, even drawing up, or at least revising, according to Calderwood, in 1597, the defence for refusing to subscribe the bond demanded of the clergy by the king, it was not long before he began to side with the court party, and to favor a moderate episcopacy. In 1603 he was one of 5 clergymen selected by James I. to accompany him to London for his coronation, and while there was appointed to succeed Beatoun as archbishop of Glasgow. He used henceforward his best exertions for the establishment of episcopacy in Scotland, and, though not given to violent measures, incurred much odium among the great body of the Scottish people. In 1609 he was appointed an extraordinary lord of session, but until 1610 was obliged to remain subject to the ordinary church courts. In 1610 he and two other Scottish bishops received episcopal ordination at the hands of English bishops, and soon after he was appointed head of one of the courts of high commission for trying offences against the church. He became primate of all Scotland in 1615, and the two courts of high commission were consolidated under his presidency. Under instructions from James I., though it is alleged contrary to his own wishes, he introduced the forms, services, appurtenances, and substantially the liturgy of the English church. In 1633 he placed the crown on the head of Charles I. as king of Scotland. He was appointed in 1635 lord high chancellor of Scotland. In consequence of the indignation aroused by the imposition of a book of canons and a new liturgy on the people, by order of the king, Spotswood in 1637 retired to Newcastle, and finally to London. He wrote a "History of the Church of Scotland, from the Year 203 to the Close of the Reign of James VI." (fol., London, 1655), and one or two smaller works.

SPOTTED FEVER (*typhus petechialis*, *typhus syncopalis*, or *typhus gravior*), an epidemic fever which prevailed in New England, New York, and Pennsylvania from 1807 to 1815. Medical writers now generally consider it as a form of malignant typhus, taking on, as epidemics of typhus are apt to do, certain peculiar characteristics, and possibly modified somewhat by the treatment adopted by some of the leading physicians. It is said to have appeared first in Medfield, Mass., in March, 1806, and a year later in the Connecticut valley and along the Hoosic and Green mountain ranges; it disappeared usually during the summer, but recurred for several years, with annually increasing violence, from January to April. It was most prevalent and fatal in 1812 and 1813. Its last appearance was at Berwick, Me., in 1815. The name spotted fever is inappropriate, if intended to indicate a fever distinct from the severe or malignant typhus, for the presence of both a red rash and of purple spots in that disease is one of its most marked symptoms; but the specific differences between this epidemic and ordinary typhus were said to be the time of year when it was most prevalent, spring instead of autumn; its avoidance of large towns, prevailing rather in thinly settled districts; its attacking more generally healthy and robust adults, rather than the weak, the young, or aged, and those of broken constitutions; and its stubborn resistance to the ordinary modes of treatment. It was very fatal, especially in the scattered population of villages, in which many heads of families were taken. In the latter part of its course it was very generally combined with local inflammations, particularly of the lungs or throat, but the symptoms of prostration which led to the name "sinking typhus," often applied to it, were even more strongly marked than in its earlier history.—The treatment of this epidemic led to a radical and bitter division in the medical profession. One party used stimulants very freely, avoiding bloodletting, and using from the commencement cinchona, brandy, opium, the tinctures of cinnamon, peppermint, lavender, &c., and these not so much with reference to the quantities given as the effects produced. Cathartics and emetics were used by this class of practitioners sparingly if at all, and cold water and other diluents sternly prohibited. In the use of this treatment they asserted that they were more successful than their opponents, and though the recoveries which took place were slow, they deemed them sure. The physicians who discarded this mode of treatment argued that the disease was at first a congestion, and that bleeding, either general or local, was necessary to relieve this, and if practised would be followed by less prostration and a more speedy recovery. This view gained prevalence after the appearance of the local inflammations in connection with the fever. The antiphlogistic physicians, as they were called, generally preferred local bleeding by leeches or cups to general; they administered calomel and mild cathartics and emetics, and after a time sustained the strength by the use of vegetable and mineral tonics. The mortality under either mode of treatment was very great, and neither had much cause to boast over the other. For many years subsequently the community as well as the physicians, especially in New England, were divided into two hostile parties, the stimulants and the antiphlogistics; and the controversy has hardly yet completely ceased.—The most noteworthy works on the epidemic were Miner and Tully's "Essays on Fevers and other Subjects" (1823); Miner, "Typhus Syncopalis" (1825); North and Strong on "Spotted Fever;" report of a committee of the Massachusetts medical society in its "Transactions," vol. ii.; Gallup on the "Epidemics of Vermont;" and Hale on the "Spotted Fever in Gardiner."

SPOTTSYLVANIA, an E. co. of Va., bounded N. E. by the Rappahannock and S. E. by the North Anna river, and drained by the Mattapony; area, 400 sq. m.; pop. in 1860, 16,076, of whom 7,786 were slaves. The surface is hilly and the soil fertile. Granite and freestone are abundant. The productions in 1850 were 102,958 bushels of wheat, 265,758 of Indian corn, 47,487 of oats, 1,279 tons of hay, and 52,056 lbs. of butter. There were 3 newspaper offices, 20 churches, and 761 pupils attending schools. The Richmond and Fredericksburg railroad and the Rappahannock canal intersect the county. The value of real estate in 1856 was $3,661,265, showing an increase of 23 per cent. since 1850. Capital, Spottsylvania Court House.

SPRAGUE, CHARLES, an American poet, born in Boston, Oct. 25, 1791. At the age of 13 he entered a mercantile house as clerk, and subsequently was taken into partnership by his employers. In 1820 he became teller in the State bank; and in 1825, on the establishment of the Globe bank, he was appointed its cashier, an office which he still holds. In 1821 he became known as a poet by being the successful competitor for the prize offered for the best prologue at the opening of the Park theatre in New York. Similar successes were won by him in 1822, at the opening of the new Philadelphia theatre; in 1828, at the opening of the Salem theatre; in the same year, at the opening of another theatre in Philadelphia; and in 1830 at the opening of the Portsmouth theatre. In 1823 he obtained the prize offered for the best ode to be recited at the exhibition at the Boston theatre of a pageant in honor of Shakespeare; and in 1830 he pronounced an ode at the centennial celebration of the settlement of Boston. In 1829 he delivered a poem on "Curiosity," in the heroic measure, before the Phi Beta Kappa society in Cambridge, considered his best production. On the 4th of July, 1825, he pronounced the usual commemorative discourse before the citizens of Boston; and in 1827 he gave an address on intemperance. A new and revised edition of Mr. Sprague's writings was published in Boston in 1850.

SPRAGUE, WILLIAM BUEL, D.D., an American clergyman and author, born in Andover, Conn., Oct. 16, 1795. He was graduated at Yale college in 1815, and for nearly a year thereafter was a private tutor in the family of Major Lawrence Lewis, a nephew of Gen. Washington, who resided on a part of the original Mount Vernon plantation. He afterward studied for 3 years in the theological seminary at Princeton; and in Aug. 1819, he was ordained pastor of the Presbyterian church at West Springfield, Mass., as a colleague of the Rev. Joseph Lathrop, D.D. Here he continued 10 years, and on Aug. 26, 1829, was installed pastor of the second Presbyterian church in Albany, where he still remains. He visited Europe in 1828, and again in 1836. The degree of D.D. was conferred upon him by Columbia college in 1828, and by Harvard college in 1848. Dr. Sprague published in 1822 a volume of "Letters to a Daughter," which, being issued anonymously, was soon after published in Great Britain, and then republished in America as an English book. His subsequent works are: "Letters from Europe" (12mo., 1825); "Lectures to Young People" (1825); "Lectures on Revivals of Religion" (8vo., 1832); "Hints on Christian Intercourse" (1834); "Lectures illustrating the Contrast between true Christianity and various other Systems" (1837); "Memoir of Edward D. Griffin, D.D.," as an introduction to the volumes of sermons of that distinguished divine (1839); "Life of Timothy Dwight, D.D., President of Yale College," in Sparks's "American Biography" (1845); "Aids to Early Religion" (1847); "Words to a Young Man's Conscience" (1848); "Letters to Young Men, founded on the History of Joseph" (1854); "Visits to European Celebrities" (1855); and "Annals of the American Pulpit," a collection of biographies of leading clergymen of all the denominations, which has reached 7 vols. 8vo. (1857–'61), and 2 more remain to be published. Of the books above named, nearly all have passed through several editions. He has written introductory essays to many works, contributed much to periodicals, and published also about 140 occasional sermons, addresses, &c.

SPRAT, a small fish of the herring family, and genus *harengula* (Val.). There are teeth on the jaws, tongue, palate, and pterygoid bones, but none on the vomer; the branchiostegal rays are 6 or 7. There are about 10 species, of which the most common is the English sprat (*H. sprattus*, Val.), called garvie in Scotland; it is 5 or 6 inches long, with the body proportionally deeper than in the herring, and the edge of the abdomen strongly serrated; the scales are large, round, and deciduous; the upper part of head and back dark blue, with green reflections, passing into silvery white on the gill covers, sides, and abdomen; dorsal and caudal dusky, other fins white. It is found on the coasts of Great Britain and Sweden, and in the English channel and North sea; it ascends the rivers in large shoals in November, after the herrings have disappeared. Though smaller and not commercially so important as the herring, it furnishes in the winter an abundant, cheap, and wholesome food, and is generally eaten fresh. The fishery is prosecuted by drift or stationary nets, and with most success in dark and foggy nights; it employs about 500 boats, which capture many thousand tons in some seasons; the excess is sold at 10 to 12 cents a bushel for manure, the farmers using about 40 bushels to an acre of land. The *blanquette* of the French coasts (*H. latulus*, Val.) is 3½ to 4 inches long, of a brilliant silvery white, tinged with greenish on the back; the flesh is dry, but sweet; they live a long time out of water. Several species in the West Indian seas are called sardines.

SPRAT, THOMAS, an English prelate and author, born in Tallaton, Devonshire, in 1636, died at Bromley, Kent, May 30, 1713. He was educated at Wadham college, Oxford, and after the restoration entered holy orders, and became chaplain first to the duke of Buckingham, and afterward to Charles II. He was one of the original fellows of the royal society. In 1668 he was made prebendary of Westminster, in 1680 canon of Windsor, in 1683 dean of Westminster, and in 1684 bishop of Rochester. He was clerk of the closet to James II., in 1685 was made dean of the chapel royal, and in 1686 one of the commissioners for ecclesiastical affairs. On the abdication of James, Sprat was one of those who, in the convention held on that occasion, proposed the appointment of a regent. An unsuccessful attempt was made in 1692 to implicate the bishop in a pretended plot to restore King James. He published "The Plague of Athens" and "The Death of Oliver Cromwell," poems (1659); "The History of the Royal Society" (1677); "The History of the Rye House Plot" (1685); and a volume of sermons; and he edited Cowley's "Poems," with a life (1679).

SPRENGEL, Kurt, a German physician and botanist, born at Boldekow, Pomerania, Aug. 3, 1766, died March 15, 1833. In 1784 he began at Halle the study of theology and medicine, but relinquished the former study, and took his medical degree in 1787. In 1789 he was appointed extraordinary professor of medicine in Halle, in 1795 ordinary professor in the same department, and in 1797 professor of botany, in which position he passed the remainder of his life. Sprengel's first work, *Anleitung zur Botanik für Frauenzimmer*, was published when he was but 14 years old; and his subsequent medical and botanical works procured for him honorary diplomas from upward of 70 learned societies, and invitations to fill various important professorships.

SPRENGER, Aloys, a German orientalist, born at Nassereut, Tyrol, Sept. 3, 1813. After having studied medicine, natural sciences, and oriental languages at the university of Vienna, he went in 1836 to London, where he assisted the earl of Munster in his work on the "Military Science of the Mohammedan Nations." On the recommendation of Munster before his death, he received an appointment in the East India service, and in 1845 became president of the college of Delhi. In 1850 he was appointed examiner at the college of Fort William, interpreter of the government, and secretary of the Asiatic society of Bengal. He has published several editions of oriental writers, several works in the Urdu dialect, and a "Life of Mohammed" (vol. i., Allahabad, 1851). In 1859 the academy of inscriptions at Paris divided between Sprenger, Noeldeke, and Amari a prize for the best history of the Koran. He has engaged upon a new biography of Mohammed, in the German language, to be completed in 4 volumes, the first of which appeared in 1861.

SPRING, a current of water flowing out of the ground. Springs are produced from the water that falls upon the earth, and percolates through the soil, gathering in little rills, the "fountain heads of lakes and rivers underground." These find their way to the surface at lower levels, often at great distances from the localities that received the supplies from the atmosphere, and exhibit in their flow and the qualities of their waters a variety of interesting phenomena, some of which have already been considered in the articles ARTESIAN WELLS, GEYSERS, and MINERAL WATERS. From the times of earliest history, springs or wells of water have been objects of special regard. The wells in the vicinity of eastern towns and cities, and in the pasture lands, were resorted to by the women to draw water for domestic uses and for watering their flocks. The same custom there prevailed when Isaac met Rebekah at the well of Haran, and again when, 2,000 years afterward, it is alluded to in the account of the woman of Samaria. Everywhere springs are suggestive of fertility, and even where they abound some among them are resorted to for the peculiar purity and refreshing coolness of their waters. Those of the same vicinity, supplied through different strata and from different sources, vary materially in their qualities. Some, forced up through beds of clean sand, are filtered of all impurities, though their source may be in dense swamps filled with decaying vegetable matters. Some, flowing to the surface through strata of limestone, though clear and apparently pure, contain so much calcareous matter in solution, that the water is characterized by that quality termed hardness; while others but a few yards distant, coming out through sandstone rocks, are eminently soft and pure. The phenomenon of hot and cold springs in close proximity has often been noticed since the time of Homer, who ascribed the source of the Scamander to two neighboring fountains of this character. A singular phenomenon relating to springs, observed by Prof. Brocklesby of Hartford, Conn., is their rising a little while before rain. Upon the summit of a high hill in the W. part of Rutland, Vt., is a spring which is almost always thus affected, sometimes two days before the rain appears; and another of similar character is said to exist in Concord, Mass. Prof. Brocklesby supposes the phenomenon is due to a diminished atmospheric pressure, which would also be indicated by a fall of the barometer. For the height of the spring at any time is determined by the relative force exerted by the atmosphere to keep the water down, and by the hydrostatic pressure to lift it up; and the channels and sources of supply of some springs may be so formed that the effect of diminished atmospheric pressure may thus be very sensibly indicated. The discharge of springs is often so uniform through periods of drought as well as of rain, that it is evident they must be connected with reservoirs beneath the surface too extensive to be affected by ordinary irregularities of supply; and there may well be such reservoirs of water when those of rock oil, as described in the article PETROLEUM, are sufficient to maintain continual supplies of this fluid for thousands of years. Such springs, called perennial, gush forth sometimes in large currents as well as in little rivulets, and rivers thus originate from the continuation of great subterranean currents. Instances of this kind are most common in limestone regions. It is this rock in which the great caves of the earth are usually found, and a common feature in these is a river large enough sometimes to be navigated by boats. In the Nicojack cave, Dade co., Ga., near the Tennessee river, there is said to be a waterfall 3 miles underground. As the rivers leave the caverns, and flow over the surface, they occasionally fall into other chasms and disappear, coming out again in great springs, it may be several miles off. Sometimes it happens that the readiest outlet is in the bed of the ocean, and the fresh water is violently forced by its greater head up through the salt water, so that it may be collected at the surface almost or entirely unmixed. A spring of this kind in Boston harbor, now covered by Long wharf, supplies the shipping with water; another in the gulf of Spezia, a branch of the gulf of Genoa, rises in a powerful jet; and on the S. coast of Cuba, some distance from the shore, the fresh water springs burst upward with such violence that boats cannot safely approach the spot. Intermitting springs are those which flow for a certain period and then cease for a time, and so on alternately flowing and disappearing without regard to the supplies of rain. This is probably owing to the water collecting in a natural reservoir at an upper level, the outlet of which is a close channel through the rock curved upward so as to act like a siphon. When the water fills the reservoir and rises above the arch of the siphon, the flow commences, and continues until the discharge has carried the water down to the level of the shorter limb of the siphon; it then stops until the water has regained its former height. The younger Pliny in a letter to Licinius describes a spring of this character near the Larian lake, the modern lake of Como, which ebbs and flows regularly 3 times a day. A more celebrated one is the ancient pool of Siloam, which was observed by Dr. Robinson as still rising and falling at intervals in the manner described by Jerome and subsequent writers. From the inhabitants of the vicinity he learned that the flowing occurs at irregular intervals; sometimes 2 or 3 times a day, and sometimes, in summer, once in 2 or 3 days. The Geysers are intermitting hot springs; but the changes in their flow are due to other causes, as probably the sudden conversion of the waters into steam by coming in contact with beds of highly heated rock or lava, or the accumulation of large quantities of steam in the upper part of cavities until it can drive out the water beneath through the channels leading from the bottom to the surface. Hot springs are common in volcanic countries, in regions of extinct volcanoes, as that of Auvergne in central France, and in districts where the rock formations are traversed and displaced by long and deep lines of faults, as in central Virginia. In these localities the waters must penetrate far down to highly heated beds of rock, possibly ancient lava beds not yet cooled; or the depth may be so great that their high temperature may be owing to the general increase of heat observed in descending into the interior. (See CENTRAL HEAT.) Heated, and at the same time under great pressure, the waters possess powerful solvent properties, and thus they become charged with salts and gases by which the mineral springs are characterized. As the waters cool or evaporate, some portion of the solid matters held in solution is set free and deposited around the springs. Thus are produced great beds of travertine, such as are observed in Tuscany and other parts of Italy—a spongy deposit of calcareous matter, which incrusts all substances it comes in contact with, and rapidly forms one class of petrifactions. The thermal springs of Hierapolis in Asia Minor were particularly celebrated in ancient times; and it was stated of the transforming power of the waters, that if these were led about the vineyards and gardens the channels became long fences, each a single stone. At the present time there is to be seen a powerful hot spring at the place, and a cliff of calcareous rock formed from its deposits. The Geysers furnish examples of silicious deposits similarly produced. Cold springs as well as hot are often charged with ferruginous matters, derived from the decomposition of pyritous iron contained in the rocks over which the waters have flowed. The great ochreous deposits result from such springs, and the accumulations sometimes amount to important beds of iron ore, as described under BOG ORE. Springs charged with different mineral substances which give to them special importance are further noticed in the account of these minerals under their own names, as BORACIC ACID, GAS, PETROLEUM, and SALT.

SPRING, in astronomy, one of the 4 seasons of the year, commencing for the northern hemisphere at the time of the vernal equinox, or on March 21, and ending at the time of the summer solstice, or June 21. In the United States the spring is regarded as including the 3 months March, April, and May. (See SEASONS.)

SPRING, in mechanics, an elastic body, variously constructed and of different materials according to the purpose for which it is designed. The applications of springs are very numerous and for many totally different objects. Many are used, as in carriages, to relieve the jar caused by hard bodies coming suddenly in contact with each other; others as a moving power, acting through the tendency of a coiled metallic spring to unwind itself (see CLOCKS AND WATCHES), or by sudden release from a state of tension to communicate motion, as the bow to the arrow, the gun spring to the cock, the spring pole to the drill, and in many more such instances; others are employed as regulators to control the movements of wheel work, as seen in the hair springs of watches. All of the above act on the principle of resisting compression; others, by the amount of extension produced in a spring coiled around a central axis, are used as measurers of weight. (See BALANCE.)—In organic bodies springs are also a common feature, and serve some of the purposes for which they are introduced in mechanical structures. The cartilages in the joints are springs that prevent the ends of the bones from jarring upon each other. It is by the sudden release of a springy membrane in the structure of the flea, that this little animal is enabled to project itself instantaneously 200 times the height of its own body; and in the vegetable kingdom springs are provided, sometimes round the outside and sometimes round the inside of the seed vessels, which finally burst these suddenly open, and scatter the seeds for the next crop.—Carriage springs contribute not merely to the comfort of the rider, but they lessen the force of draught by easing the load over the obstacles, and very materially increase the durability of the carriage itself. One of the early forms of these springs, introduced in the 17th century, consisted of two broad leather straps extending from an elevated framework on one axle to a similar frame on the other; upon these the body of the carriage was securely fastened. The antique 4-wheeled state carriages of Europe are mostly constructed on this plan; and a good evidence of its efficiency is the fact that many of the best stage coaches of the present time are thus supported. The principle was also in common use not long since in 2-wheeled gigs or chaises, and is still in the West Indian *volante*, points of support behind being provided by two long slender arms, connected by a cross bar at their extremities, to which bar the straps are secured. Swung upon the straps, which admit a limited lateral motion, with the advantage of the elasticity of the arms behind and of the shafts in front, the spring of these carriages is most perfect. An improvement was early introduced by making the frames that supported the straps elastic, by means of bands of steel curved over in the shape of the letter C, over the top of which the straps, secured at the bottom, were passed. The strength of these springs may be increased to any desired extent, by introducing several thicknesses of steel plates in the lower portion of the spring. Sometimes the framework which supports the C springs rests itself upon the form of elliptic springs known as under springs. Steel springs of various forms are now generally in use for carriages, being light and occupying little room. Those known as elliptic are steel plates or thin bars, so shaped that when two are put together they present an elliptical figure, and being secured together at the ends a spring is produced as pressure is brought to bear upon them to flatten the ellipse. They are bolted below upon the axle and above to the frame of the carriage by their central part, and are strengthened by additional thicknesses of steel in this portion. Very strong springs, for the heaviest wagons and railroad cars, are made of straight pieces of steel plates of gradually increasing lengths piled one upon another and fastened directly to the axle, or else over and across each end of it to the frame which rests upon the axles at these points. The frame of the carriage is secured to the ends of the longest and uppermost plate by eye bolts passing through these ends, which are turned over for their reception.—The varieties of steel springs for carriages are too numerous to be particularly named. Locomotives and railroad carriages demanded springs of unusual strength and efficiency, and to act as near as possible with equal effect under heavy and light loads. These also have been devised of different forms and materials. Air, being the most elastic of all bodies, makes an excellent spring, the weight resting upon inverted hollow cylinders, set upon pistons fitting air-tight. In practice it has been found exceedingly difficult to prevent the escape of the air around the piston; and the following improvement has been devised for this purpose. The inverted cylinder, or rough cup, is provided with a very strong but flexible diaphragm or cover of several thicknesses of India rubber, stout canvas, and leather, covered on the inside with sugar house molasses. This rests upon a rounded head of wood, and is filled out with compressed air forced in by a small air pump, the pressure amounting it may be to 150 lbs. to the square inch. To prevent the air from passing through the pores of the cast iron pump, this is lined with tin. India rubber car springs are very extensively used. They are made of disks of any thickness, piled upon each other to any desired height, and contained in a cylindrical case, in the top of which fits a piston resting on the pile. It is obvious that between the frame to which the pistons are attached and the weight other springs may be introduced. Instead of India rubber disks others of steel are also used, saucer-shaped, and arranged in pairs upon each other, the pair consisting of two disks set face to face. The disks are made more durable and efficient by corrugating the metal. Another form is of flat disks of steel, less than 1/16 of an inch thick, set between disks of cast iron of the same diameter, and made alternately with convex and concave surfaces. The tendency of the pressure applied to such a pile is to change the flat steel face into a slightly dishing form, which is resisted by the elasticity of the steel. Single disks operate when the load is light; the occasional introduction of two together in the pile provides for the same action with an increased load, and of three or more for still greater weights. Thus the same pile is very ingeniously made to furnish springs of different degrees of stiffness, which are brought into action only as the load upon them requires. A pile 6 inches high and of 5 inches diameter of outside case admits a motion of 1½ inches before it is fully compressed. Springs thus designed for sustaining heavy bodies may be also applied to prevent their horizontal concussion, as of cars upon railroads, and also to relieve them from the sudden jerk which without springs they would receive in starting.—How it is that steel when tempered receives the high degree of elasticity that renders this metal so useful for springs is not understood. By grinding and polishing the property may be lost, and by hardening and tempering it is restored. It thus seems probable that the elasticity resides in the thin blue oxidized surface. The removal of the blue tint from a pendulum spring by its immersion in weak acid was found by Mr. Dent to impair its elasticity, causing the chronometer to lose nearly a minute each hour; and a second and equal immersion scarcely caused any further loss. In stating this to the British association, he added that such springs get stronger in a minute degree during the first 2 or 3 years they are in use, from some atmospheric change; when they are coated with gold by the electrotype process no such change is observable. Watch springs, as described by Holtzapffel, are hammered out of round steel wire, of suitable diameter, until they fill the gauge for width, which also insures equality of thickness. When the holes are punched in their ends and they are filed smooth on the edge, they are bound with wire in a loose open coil, and heated over a charcoal fire upon a perforated revolving plate. They are then hardened by dipping them in oil, and the oil is blazed off. The next process is grinding and polishing with emery and oil between lead blocks, which destroys the elasticity. A subsequent hammering on a very bright anvil restores this, "putting the nature into the spring." The coloring of orange or deep blue, which some consider merely ornamental, is imparted by moving the spring back and forth 2 or 3 inches at a time over a flat plate of iron or wood under which a little spirit lamp is kept burning. The spring is finally coiled by attaching it when cold to a small axis and causing this to revolve by means of its winch handle. Chronometer balance springs, of screw form, are shaped and tempered by winding them into the square thread of a screw of the right diameter and pitch. The two ends being fastened to the screw, the whole is carefully enveloped in platinum foil and tightly bound with wire. It is then heated in a piece of gun barrel closed at one end and plunged into oil, which hardens the spring almost without discoloring it. The outer covering is now taken off, and the spring is let down to the blue before it is released. The hair springs of common watches are frequently left soft; but the best are hardened in the coil upon the plain cylinder, and are then curled into the spiral form between the edge of a blunt knife and the thumb, as in curling up a narrow ribbon or paper. These springs are so delicate that it takes 3,200 of them to weigh an ounce; the soft ones are valued at 2*s.* 6*d.* each, and the hardened and tempered ones at 10*s.* 6*d.* Thus an ounce of metal, worth originally less than 2*d.*, is made in the one case worth £400, in the other £1,600.

SPRING BALANCE. See Balance.

SPRING, Samuel, D.D., an American clergyman, born at Northbridge, Mass., Feb. 27, 1746, died in Newburyport, March 4, 1819. He was graduated at Princeton college in 1771, and in 1775, having been licensed to preach, became a chaplain in the continental army, and accompanied the expedition under Col. Arnold to Canada. At the close of 1776 he left the army, and in 1777 was ordained pastor of a church in Newburyport, in which relation he continued till his death. He was a man of great influence and weight of character, and, as the leading minister of the Hopkinsian party, was active in promoting the union of the two parties in the Congregational church, effected by the establishment of the Andover theological seminary, and also in the organization of the American board of commissioners for foreign missions. He published about 25 miscellaneous discourses, and one or two small controversial works.—**Gardiner**, D.D., LL.D., an American clergyman, son of the preceding, born at Newburyport, Mass., in Feb. 1785. He was graduated at Yale college in 1805, and after studying law a short time went to the island of Bermuda as a teacher, and remained there nearly two years, at the same time pursuing the study of law. After his return he was admitted to the bar, and practised more than a year, when he resolved to devote himself to the ministry. He studied about 8 months at the Andover seminary, and was ordained as pastor of the Brick church (Presbyterian) in New York, Aug. 10, 1810, in which office he still continues (1862). He has been elected successively president of Hamilton and Dartmouth colleges, but in both cases declined. Beside a large number of sermons and addresses in pamphlet form, and numerous contributions to periodicals, he has published "Essays on the Distinguishing Traits of Christian Character" (8vo., 1813); "Memoirs of the Rev. Samuel J. Mills" (8vo., 1820); "Fragments from the Study of a Pastor" (12mo., 1838); "Obligations of the World to the Bible" (12mo., 1844); "The Attraction of the Cross" (8vo., 1845); "The Bible not of Man" (12mo., 1847); "Discourses to Seamen" (12mo., 1847); "The Power of the Pulpit" (12mo., 1848); "Memoirs of Hannah L. Murray" (8vo., 1849); "The Mercy Seat" (8vo., 1849); "First Things" (2 vols. 8vo., 1851); "The Glory of Christ" (2 vols. 8vo., 1852); "Contrast between Good and Bad Men" (2 vols. 8vo., 1855); "Brick Church Memorial" (8vo., 1861).

SPRINGFIELD, a city and the shire town of Hampden co., Mass., situated on the E. bank of the Connecticut river, 98 m. W. by S. from Boston, and 138 m. N. N. E. from New York, in lat. 42° 6′ 10″ N., long. 72° 35′ 12″ W.; pop. in 1860, 15,199. The town is drained by Mill river, which furnishes water power for manufacturing establishments. The E. portion of the town, where the U. S. armory is situated, is considerably elevated, while the W. part is level. The city is well built, and has wide streets which are lined with trees. The city hall is a noble building in the Romanesque style, and, beside the city offices and library, has a large public hall which will accommodate comfortably an audience of over 2,500 persons. There are 12 churches in the city, viz.: 1 African, 1 Baptist, 4 Congregational, 1 Episcopal, 1 Roman Catholic, 1 Second Advent, 1 Swedenborgian, 1 Unitarian, and 1 Universalist. The city library, formed in 1859, has rooms in the city hall, and numbers 8,000 volumes; there is a valuable scientific and historical museum in connection with it, and both are rapidly increasing. The schools of the city include 1 high, 17 grammar, 15 primary, and 6 mixed schools. There is one newspaper, issuing daily, weekly, and tri-weekly editions, and having a larger circulation than any other newspaper in New England out of Boston. The city has 5 banks, with an aggregate capital of $1,200,000; 8 savings banks, with $1,381,745.68 on deposit; 4 fire insurance companies, with an aggregate capital of $650,000; and a mutual life insurance company, with $400,000 capital. Hampden park, opened in 1857 for national horse shows, on the bank of the Connecticut, contains 60 acres, with a costly dike to protect it from the spring freshets. The Springfield cemetery contains about 40 acres, with a great variety of shade trees and fountains. Springfield is the focal point of 3 lines of railroad, which meet in one immense station house, each having extensive connections; these are the western railroad, to Albany, connecting at Worcester with the Boston and Worcester; the New Haven, Hartford, and Springfield; and the Connecticut river railroad.—The manufactures are important. The great national armory is now the only manufactory of small arms owned and worked by the United States government. The process of manufacturing the rifle musket, the principal arm now made, and which requires for its completion more than 500 distinct operations, is described in the article GUN, vol. viii. p. 572. In addition to the ample water power, a steam engine of 70 horse power has recently been introduced. Over 1,500 men are employed, the work is kept up night and day, and the production is nearly 12,000 complete guns per month, and is to be increased by additions of men and machinery till 200,000 stand of arms are produced annually. The workmen are all paid by the piece. The germ of the armory existed during the revolution, but it was not formally established till 1794. From that time till 1841 it was under civil superintendence, and the work was not satisfactory. In 1841 Major (now Brigadier-General) J. W. Ripley was appointed superintendent. In 1854 a change was again made to a civil superintendency, but Major Ripley's system was maintained. During the year 1861 a military superintendent, Major Dyer, was again appointed, and the vast increase of production consequent upon the war has been made without any deterioration in the quality of the arm. The weapon now made is of the model of 1855, and varies little from the Enfield musket. Maynard's primer has been discarded, and the nipple for percussion caps restored. The weight of the rifle musket is 9½ lbs. When not required for immediate use, the guns are stored in the great arsenal, 200 feet long by 70 wide and 3 stories high, which is capable of containing 100,000 stand of arms on each floor. The armory grounds, which are extensive, are enclosed with an iron fence and beautifully laid out with trees, shrubbery, and flowers. New buildings, required by the exigencies of the time, and for which an appropriation of $500,000 has been made, are soon to be erected. The manufacture of firearms is also carried on by several private firms. There is a large machine factory, making steam engines and boilers, steam saw mills, cotton presses, and coining and gun-making machinery; 2 extensive founderies for casting car and locomotive wheels, and various light and heavy work; a car manufactory, building baggage, freight, and passenger railroad cars to order, and also artillery carriages for the government; a gas company, furnishing the city; 2 sash, blind, and door manufactories; a steam saw and lumber dressing mill; an India rubber manufacturing company, making suspender and other elastic goods; a candy manufactory, a paint and chemical company, a woollen mill, several flouring mills, and two gold chain manufactories.—Springfield was made a city in 1852. It is divided into 8 wards, and is governed by a mayor elected annually, 8 aldermen, and 16 common councilmen. The fire department embraces 6 engine companies, 2 of which belong to the U. S. armory, but do duty wherever required. —Springfield was first settled in 1635 by emigrants from Roxbury, who on May 14 drew up and signed an agreement for self-government. The place was first named Agawam, the Indian name of a river of West Springfield, which with several adjacent towns was then included in its boundaries. In 1637 a church was formed, and in 1638 the settlers chose William Pynchon magistrate, and in April of the same year named the settlement Springfield (from the name of his residence in England) in compliment to him. Mr. Pynchon, who was an enterprising merchant as well as a theologian and author, returned to England in 1652; but his son John remained, and in 1662 erected the famous "Pynchon house," the first brick house in the Connecticut valley, and long a serviceable fortress against the assaults of the Indians. This venerable structure stood till 1831, and is represented on the city seal. In 1675, during King Philip's war, the Indians burned the settlement, destroying about 30 houses and 25 barns. In Jan. 1787, the armory, which then contained a considerable quantity of arms, was attacked by Daniel Shays and his party, during Shays's rebellion; but they were dispersed at the firing of the first cannon by the state troops. The growth of the town was slow till the opening of the western railroad in 1838, since which it has increased rapidly.

SPRINGFIELD, a city and the capital of Clarke co., Ohio, situated near the junction of Lagonda creek with Mad river, 43 m. W. from Columbus, and 84 m. N. from Cincinnati; pop. in 1860, 7,202. It is in the heart of one of the richest and most populous agricultural regions in the Union, and is well laid out and handsomely built. The public buildings are substantial structures, and there are many elegant private residences. It has great water power for manufacturing purposes, and there are numerous large flouring mills in and around the city. There are iron founderies, machine shops, 2 linseed oil mills, a woollen factory, a paper mill, and numerous other factories. Limestone is largely quarried and burned, producing lime of excellent quality. A number of important railroads centre here, viz.: the Springfield and Columbus; the Sandusky, Dayton, and Cincinnati; the Springfield and Delaware; the Little Miami; and the Columbus and Xenia. There are 1 daily, 1 tri-weekly, and 2 weekly newspapers, 3 banks, 16 churches, and 2 flourishing female seminaries. Wittenberg college (Lutheran) is situated here. A large trade is carried on in wheat, flour, Indian corn, and other produce, and many cattle and swine are exported by railroad to eastern markets.

SPRINGFIELD, a city and the capital of Illinois, and seat of justice of Sangamon co., 188 m. S. W. from Chicago, and 97 m. N. N. E. from St. Louis; pop. in 1860, 9,600. It is situated on a beautiful prairie, 4 m. S. of Sangamon river. Its streets are broad, intersect each other at right angles, and are tastefully adorned with shade trees. From the beauty of the place and its surroundings, it is termed the "Flower City." The state house is one of the finest buildings of the kind in the country, and the other public buildings are handsome and substantial structures. There are 5 newspapers, 4 banking houses, several steam flouring mills, founderies and machine shops, 12 or 14 churches, and 4 public and several private schools. It is the seat of the Illinois state university. It is on the line of the St. Louis, Alton, and Chicago, and the Toledo, Wabash, and Great Western railroads, and is the point of shipment for immense quantities of produce and great numbers of cattle and swine. The value of real and personal property in 1857 was $4,451,907. Springfield was made the state capital in 1836, and was incorporated as a city in 1840.

SPRINGFIELD, the capital of Greene co., Mo., on the line of the S. W. branch of the Pacific railroad, 250 m. S. W. from St. Louis, and 130 S. S. W. from Jefferson City; pop. about 1,500. Its situation is high and healthy, and prior to the commencement of the war of secession it was the most important and flourishing town in S. W. Missouri. It has a city charter. During the war Springfield and its vicinity have been the scene of several important movements. Brig. Gen. Lyon, commanding a division of the federal forces, arrived at Springfield, Aug. 5, 1861. On the 8th a skirmish occurred at Dug creek; and on the 10th a battle was fought at David's and Wilson's creeks, the first 9 and the second 15 miles from Springfield, in which Gen. Lyon, with 3 divisions, commanded by Gen. Sigel, Major Sturgis, and himself, attacked the confederate force in greatly superior numbers under Gens. McCulloch and Price; and after 6 hours' severe fighting, the federal troops remained in possession of the camp, but with the loss of Gen. Lyon and 223 killed, 721 wounded, and 291 taken prisoners on the federal side, and a still heavier loss on the side of the confederates. After the battle Gen. Sigel, taking the chief command, was obliged to fall back on Springfield and the next day to Rolla, to await reënforcements. Gen. Rains, of the confederate army, occupied Springfield with 4 regiments of cavalry on the evening of the 11th. On Oct. 25 Major Charles Zágonyi, commander of Gen. Fremont's body guard, with 160 mounted troops of that guard, in advance of the main federal army, attacked the confederate force at Springfield and captured the town, while held by about 2,000 troops; his loss was 50 killed, wounded, and missing; the confederate loss was 60 killed. On Nov. 3, Maj. Gen. Hunter, appointed to supersede Fremont in command of the federal forces in the department of the West, arrived with his staff at Springfield, and on the 9th abandoned it with his army and returned northeastward. On the 27th it was again occupied by the confederate forces, but again abandoned by them on the advance of the U. S. army under Gen. Curtis in Feb. 1862, by which they were driven into Arkansas and defeated at Sugar creek and Pea Ridge, Benton co., March 6, 7, and 8.

SPRUCE. See FIR.

SPURGEON, CHARLES HADDON, an English preacher, born at Kelvedon, Essex, June 19, 1834. His father and grandfather were preachers in the Independent denomination. At the age of 16 he commenced teaching as an usher at Newmarket, and subsequently at Cambridge. Not long after going to Cambridge he connected himself with a "Lay Preachers' Association" there, and went out almost every evening to some one of the villages adjacent, to conduct religious meetings. Soon he commenced preaching, and before he was 18 became pastor of a small Baptist congregation at Waterbeach, one of these villages. In 1854 he was called to the New Park street Baptist chapel in Southwark, London; and his preaching soon drew such crowds that the congregation removed first to Exeter hall, and then to Surrey music hall, the largest public room in London. In 1861 a new chapel of great size was completed for his congregation. Mr. Spurgeon for several years preached an average of nearly a sermon a day, and has beside visited the continent several times, corresponded regularly with an American newspaper, written several books, and superintended the education of a number of young men for the ministry. His sermons have nearly from the first been printed weekly, and 6 volumes have been published collectively.

SPURZHEIM, JOHN GASPAR, M.D., a Prussian philosopher, and one of the founders of phrenology, born at Longwich, Prussia, Dec. 31, 1776, died in Boston, Mass., Nov. 10, 1832. He was educated at the university of Treves, and studied divinity and philosophy. When

Treves was invaded by the French army, Spurzheim with the other students fled to Vienna, where be became acquainted with Dr. Gall, and soon after was employed as his assistant, making dissections for him. From 1805 to 1808 Spurzheim and Gall visited the principal cities of Europe, lecturing and demonstrating their views by dissections of the brain. In 1808 they presented a joint memoir to the French institute on the anatomy of the brain, explaining their discoveries; and the committee to whom it was referred reported on the whole favorably. The two phrenologists then commenced the preparation of their great work on the "Anatomy and Physiology of the Nervous System in general, and of the Brain in particular," of which Spurzheim contributed to the first two volumes. In 1813 they separated, and thenceforward prosecuted their labors independently of each other. Spurzheim, after taking his medical degree at Vienna, went to England, and delivered his first course of lectures in London, and about the same time published "Physiognomy in connection with Phrenology," and "Observations on Insanity." These works were violently attacked by Dr. John Gordon in the "Edinburgh Review," and Dr. Spurzheim at once visited Edinburgh, and in the presence of more than 500 medical students, the pupils of Dr. Gordon, demonstrated the fibrous character of the brain, which the latter had denied. He went to Paris in 1817, and lectured for several years, publishing also works on phrenology, insanity, and education. His lectures being prohibited in 1825, he went again to England, in 1831 returned to Paris, and in the summer of 1832 visited the United States. Having delivered several lectures in Boston, he was seized with a fatal fever from over exertion about 2 months after his arrival. Dr. Spurzheim's principal works, beside those already mentioned, are: "Anatomy of the Brain" (8vo., London and Boston, 1831–'2); "Phrenology, or Doctrine of the Mind" (8vo., London and New York); "Sketch of the Natural Laws of Man" (London and Boston).

SPY, as defined by Bouvier, "one who goes into a place for the purpose of ascertaining the best way of doing an injury there. The term is mostly applied to an enemy who comes into the camp for the purpose of ascertaining its situation in order to make an attack upon it." The punishment inflicted on a detected spy is death. In all time it has been an acknowledged right of nations at war with each other to avail themselves of the service of spies or secret emissaries in carrying on their hostile operations. Before entering Canaan the Hebrew lawgiver twice sent spies to examine the land and the condition of the people. Grotius and Vattel lay down numerous principles in regard to their employment. It is admitted by all writers on international law that there is something revolting to the mind of an honorable man in performing the service of a spy, and therefore a commander has not a right to compel one of his soldiers or officers to undertake it. He may urge him to it by pecuniary or other motives, but if he still refuses he may not compel him. The spy, in his assumed character, is justified in obtaining what information he can concerning the condition and purposes of the enemy, but it is wrong for him to resort to assassination or poisoning. "He may weaken the enemy," says Vattel, "by all possible means which do not affect the common safety of human society." Writers on international law also hold that a commander is justifiable in tempting or soliciting, by bribes or otherwise, an enemy's subjects to betray him, or act as spies, though they admit that such a course is hardly compatible with strict rectitude. They insist, however, that it is perfectly right to accept the offers of a traitor. The commander does not seduce him, and it is right that he should take advantage of his crime, though he may detest him for committing it.—In the history of the border wars in the western states and territories of North America, this word is frequently used to denote a species of scouts or rangers, usually backwoodsmen or hunters, who marched in the advance or on the flanks of an army, to act as guides, and to watch, as the name implies, the motions of the enemy—especially to seek and detect the ambuscades of the Indians. They were not spies in the odious military sense of that term. The service was honorable, and was equivalent to that of light troops in regular armies. This use of the word is peculiar to American history.

SQUADRON, in military science, a body of cavalry comprising 2 companies or troops, and averaging from 150 to 200 men. A detachment of ships of war employed on a particular expedition is also called a squadron.

SQUARE (Lat. *quadratum*), in geometry, a figure formed of 4 equal sides meeting each other at right angles. The term appears to have been originally applied to the corners of figures alone, and in the oldest English work on geometry (Recorde's "Ground of Arts"), the word quadrate (four-sided) is added to it when it is used to designate a square figure. It is common, even at the present time, to find it used in a similar sense, as when applied to the tool called the carpenter's T square, a rule of two limbs united at a right angle, and used for drawing right angles. The word is applied also to angles, though not to right angles, in calling a triangular file 3-square.—Square measure presents the superficial areas of surfaces in square units, as inches, feet, miles, &c.—In arithmetic, the square is a number consisting of another number multiplied by itself; and this use of the word evidently has reference to the geometrical figure, the area of which is equal to the number of units forming one of its sides multiplied by itself. The number thus multiplied is called the square root, and the method of discovering it in algebraic and arithmetical formulas is known as the extraction of the square root.

SQUASH. See Gourd.

SQUASH BUG, a well known hemipterous insect, the *coreus tristis* (De Geer). It is about ¾ of an inch long, with a triangular head; the general color is ochre yellow, rendered dusky above by numerous black dots; the sharp edges of the abdomen project beyond the closed wing covers; on the back of the head, behind the eyes, are 2 glassy raised eyelets. They appear by the last of June or beginning of July, when the squash vines have put out a few leaves, pair, and soon begin to lay their eggs; they conceal themselves by day, and in the evening fasten their eggs in little patches on the under side of the leaves by a gummy substance; the eggs are soon hatched, and the young, pale ashy and with large antennæ, at first live together in swarms; they resemble the adults except in the absence or rudimentary condition of the wings and their covers. They are hatched in successive broods during summer, pass through their last change, and attain their full size in September and October, when they leave the plants and conceal themselves in crevices, passing the winter and spring in a torpid state. The loss of sap from the punctures of these insects causes the leaves to become brown, dry, and wrinkled, when they are deserted for fresh ones. When irritated, and particularly when crushed, they give out a strong, nauseous odor. It is best to destroy them when few in number and before they have laid their eggs, or to crush the latter before the vines have begun to spread. Whatever promotes the vigorous growth of the plants renders them less liable to suffer from these bugs. The *C. marginatus* (Fabr.) of Europe is of an obscure brown, of similar habits, and emits a strong odor of apples.

SQUID, a cephalopodous mollusk, of the dibranchiate order, tribe *decapoda*, family *teuthidæ*, and genus *loligo* (Lam.). The body is elongated, tapering behind, with a pair of terminal fins; branchiæ 2; arms 8, with 2 rows of pedunculated suckers, and 2 tentacles; the internal shell, or *gladius*, is reduced to a horny quill-shaped plate, with 2 lateral expansions; the ink bag is well developed, and its secretion jet black. They are good swimmers, all marine, and never leave the water; they can creep head down on the cephalic disk; the ova are enclosed in long, gelatinous, cylindrical sheaths, called sea grapes, and may be nearly 40,000 in number; the sight is good, and the movements rapid; they are used as food by man, as on the coasts of Greece. They are sometimes called calamaries, from the internal pen-like bone and ink bag, and the general cylindrical form like an ancient escritoire. The common squid of the New England coast, the *L. illecebrosa* (Lesueur), is from 6 to 12 inches long; the colors vary rapidly, with the will of the animal, from yellowish white to bluish, violet, brown, red, and orange, in spots or general tint. They swim rapidly backward by dilating and contracting the sac-like body, and forward by the terminal fin; they devour numbers of small fish and crustaceans, and in turn are eaten by larger fishes, and used as bait by cod fishers. Descriptions and figures of this and other American species may be found in the "Journal of the Academy of Sciences of Philadelphia" (vol. ii. p. 86, 1821). In the old world, squids are found from Norway to New Zealand; the *L. vulgaris* (Lam.), common about the shores of Great Britain, and used in Cornwall as a bait for cod, attains a length of 1 to 1½ feet. The flying squids (*ommastrephes*, D'Orb.), and the hook squid (*onychoteuthis* and *enoploteuthis*, D'Orb.), have been alluded to under Mollusca.

SQUIER, Ephraim George, an American author and archæologist, born in Bethlehem, Albany co., N. Y., June 17, 1821. Having for some time taught school and studied engineering, he went to Albany in 1840 and became connected with the press, and in 1841–'2 was assistant editor of the "New York State Mechanic," a politico-scientific journal, and identified with the movements of the mechanics for a reform in the system of state prison labor. In 1843 he became editor of the "Hartford (Conn.) Daily Journal," supporting the election of Henry Clay to the presidency, and in 1844 removed to Chillicothe, Ohio, to assume the editorship of the "Scioto Gazette." While filling this position and serving one term as clerk of the lower branch of the Ohio legislature, he made an extensive survey, in conjunction with E. H. Davis, M.D., of the ancient monuments of the Mississippi valley, and prepared a work on the subject which was published in 1848 as the first volume (4to.) of the "Smithsonian Contributions to Knowledge." In the autumn of 1848 he made an exploration of the aboriginal monuments of the state of New York, which was published by the Smithsonian institution in 1849, and also at Buffalo, N. Y., in 1852 (8vo.). In March, 1849, he was appointed by President Taylor chargé d'affaires to Guatemala, with extraordinary powers to the other Central American states. His despatches, subsequently published by order of congress in 2 volumes, related not only to political matters, but to the geography, topography, climate, and resources of the country, and particularly to the projected interoceanic canal. On the death of Gen. Taylor he returned to New York, and in 1851 visited Europe, residing there a year, receiving the medal of the geographical society of France, and being made a member of the royal society of literature, fellow of the societies of antiquaries of England, France, and Denmark, &c. Returning to the United States in 1853, he conceived the plan of an interoceanic railway through the republic of Honduras, made with a corps of engineers a preliminary survey of the route, negotiated the requisite concessions from the government of Honduras, and organized at New York a company for carrying forward the work. He subsequently visited Europe, where he secured the coöperation of many English and French capitalists, and special guaranties for the road from the English and French governments. As an incident in these negotiations, he drew up the treaty between Great Britain and Honduras for the retrocession of the Bay islands, the principles of which, adopted by the former, opened the way for the adjustment of all her disputes with the Central American states. The final survey of the proposed railway was also conducted under his direction. Beside those above mentioned, Mr. Squier has published the following works, most of which have been translated into German, French, or Spanish: "Nicaragua, its People, Scenery, Ancient Monuments, and proposed Interoceanic Canal" (2 vols. 8vo., New York and London, 1852); "The Serpent Symbol, or Worship of the Reciprocal Principles of Nature in America" (8vo., New York, 1852); "Notes on Central America," &c. (1854); "Waikna, or Adventures on the Mosquito Shore," under the *nom de plume* of Samuel A. Bard (12mo., 1855); *Question Anglo-Américaine*, &c. (8vo., Paris, 1856); "The States of Central America," &c. (8vo., New York, 1857); "Report of the Survey of the Honduras Interoceanic Railway" (4to., London, 1859); "Translation, with Notes, of the Letter of Don Diego de Palacio (1571) to the Crown of Spain on the Provinces of Guatemala, San Salvador, &c." (New York, 1860); "Monograph of Authors who have written on the Aboriginal Languages of Central America" (1861); and "Tropical Fibres and their Economic Extraction" (1861). He has also contributed numerous articles to this cyclopædia and the "Encyclopædia Britannica," to the "Transactions" of the American ethnological society and of numerous scientific societies of Europe, and to many American and European periodicals and public journals.

SQUILL, the bulb of plants of the genus *scilla* or *squilla*, of which the *S. maritima*, or sea onion, furnishes the medicine called squill. The plant is perennial, and grows on the coast of the Mediterranean. The bulb is pear-shaped, from 3 to 6 inches in diameter, and consists of fleshy scales, closely laid over each other, and covered by thin, dry, external scales, which are sometimes red and sometimes white. The juice is viscid and very acrid, but its acrimony partially disappears, without loss of medicinal power, when the bulb is dried. For this purpose it is cut into thin slices, and exposed to artificial or solar heat. It is exported in oblong pieces of a white or dull yellowish white color, possessing a feeble odor, and bitter, nauseous, and acrid taste. Analyzed by Tilloy of Dijon, it was found to contain a very acrid and poisonous resinoid substance; a very bitter principle, previously recognized by Vogel and called *scillitin;* a fatty matter; citrate of lime; and mucilage and sugar. About ¼ of a grain of the first named substance was found sufficient to kill a dog.—Squill yields its medicinal properties to water, alcohol, and vinegar, and is also used in substance in the form of pill. Its effects are expectorant, diuretic, and, in large doses, emetic and purgative. It is used in combination with tartar emetic or ipecacuanha to stimulate the vessels of the lungs; and in dropsical diseases it is much employed to increase the secretory action of the kidneys.

SQUILL (*squilla*, Fabr.), a genus of crustaceans of the division *stomapoda*, so called from having the feet placed around the mouth. The body is elongated and generally slender, the head distinct from the thorax, the carapace leaving uncovered 4 of the thoracic rings, and the abdomen terminating in a wide caudal fin of several plates adapted for swimming. The antennæ of the 1st segment of the body are long, ending in 3 many-jointed filaments, cannot be bent under the head, and are inserted below the eyes near the median line; the antennæ of the 2d segment are shorter, more external, having at the base a large ciliated plate, and terminate in a single many-jointed filament; the eyes are at the end of movable appendages. The mouth is toward the posterior 3d of the carapace, and has an upper and under lip, a pair of mandibles, and 2 pairs of jaw feet arranged around it; the 3d pair of feet are prehensile, strong, bent back on themselves, serrated and spined, and used very much like the 1st pair of feet in the soothsayer (*mantis*); the next 3 pairs are directed forward, applied against the buccal apparatus, and inserted close together, with a wide, rounded, ciliated plate at the end; the last 3 thoracic limbs are slender, with styliform process and ciliated, the segments to which they are attached resembling those of the abdomen. Most of the rings of the body are complete, very nearly equal, and movable on each other; the carapace is nearly quadrilateral, longitudinally divided by 2 more or less distinct grooves; the 1st 5 abdominal rings have large false feet, to the posterior part of the base of which are attached the respiratory organs in the shape of floating, ramified, and fringed gills, which are kept constantly in motion. The heart has the form of a long vessel, a little dilated anteriorly, extending almost the length of the abdomen and thorax, sending off lateral branches to each ring; the venous sinuses in which the blood is collected before going to the gills are very large; the stomach advances far into the head. There are many species, all marine, most abundant in the tropics, but some coming as far N. as the English channel; they are usually met with far from shore and in deep water; they swim rapidly, striking the water with their powerful tail; they are voracious and carnivorous. The best known species is the *S. mantis* (Fabr.), 6 or 7 inches long, of a pale yellowish gray color, found in the Mediterranean; the carapace is widened and elongated posteriorly, with the anterior angles spiny; the prehensile feet have 6 teeth; the abdomen has 8 longitudinal rows of crests above; the caudal plates are spiny.

SQUINTING (Lat. *strabismus*), a deformity resulting from a want of parallelism between the visual axes of the eyes. Except in cases where it is caused by paralysis, spasmodic or hydropical affections, or irritation of the brain, it is not a disease, and is accompanied with no pain or lack of visual power. Ophthalmic surgeons notice 3 degrees of squinting: 1, where there is but a slight convergence or divergence from the normal axis, such as is ordinarily called a "cast of the eye;" 2, where the inclination is strongly marked, but less than half the cornea is thrown under the eyelid or within the orbit, which is the most frequent variety; 3, where the cornea is nearly or quite thrown under the eyelid or within the orbit, common among those who are born blind, but rare in the case of those who can see. The surgeons also distinguish it according to the departure from the normal axis; as convergent, where the pupil is drawn toward the nose; divergent, where it is drawn toward the outer corner of the eye; ascendent, where it is drawn upward; and descendent, where it is drawn downward. Of these, the convergent form is by far the most frequent, and next in order the divergent and ascendent. The descendent is the rarest of all. Squinting may also be double or single as one or both eyes are affected; it may be congenital, *i. e.*, existing from birth, or accidental, occurring from accident or improper treatment of the eye; the former is rare. It may be also continuous, or rarely intermittent. The cause of ordinary strabismus or squinting is the lack of equal power in the muscles which move the eye. (See Eye.)—The treatment prior to 1839 consisted in attempting by various methods to strengthen the weaker muscles, bandaging the normal eye, and compelling the constant use of the other; or by the use of goggles, spectacles, &c., in which all except the centre was opaque. In 1838 Stromeyer described the operation of dividing one of the *recti* muscles, but without having tried it on the living subject. In 1839 Dieffenbach, an eminent surgeon of Berlin, performed it successfully, and was followed by many English and French surgeons. The operation has now become very common, though the best surgeons admit that there are 3 classes of cases in which it should not be performed, viz.: those in which the position of the eye is fixed, those which result from the paralysis of the antagonist muscle, and those occurring in infants before dentition. The operation is not difficult nor particularly dangerous, and in about $\frac{3}{4}$ of the cases proves partially or entirely successful. There are two methods of performing it, the ordinary or that of Dieffenbach, where the conjunctiva is divided and the muscle to be severed is laid bare, and the subconjunctival method, where the conjunctiva is only punctured by the instrument which divides the muscle beneath it. The former is generally preferred. The operation was introduced in the United States in 1840 by Dr. Detmold.

SQUIRE. See Esquire.

SQUIRREL, the popular name of the rodents of the family *sciuridæ*, which is very numerous in species, and widely spread over the world, except in Australia. These well known, active, and familiar animals are characterized by a broad head, the frontal bone being dilated into a post-orbital process; the muzzle wide, from the development of the frontal and nasal bones; eyes large and prominent, ears moderate, and whiskers long; the hind feet 5-toed, the fore feet 4-toed, with a wart-like thumb, all the fingers and toes with compressed and curved claws; the fur is generally soft, especially in the northern species, and the tail is long, hairy, expanded laterally in the arboreal genera, and shorter and bushy in the terrestrial, and in both carried gracefully over the back; the upper lip is cleft, the cæcum large, clavicles perfect, enabling them to use the fore limbs to convey food to the mouth, and the tibia and fibula distinct; some have a membrane extended between the fore and hind limbs, as has been noticed under Flying Squirrel. The incisors are $\frac{2}{2}$, smooth in front, brown or orange, the lower compressed and sharp; molars $\frac{5-5}{4-4}$, rooted, tuberculate, with projecting transverse striæ enamelled continuously, the anterior upper one the smallest and sometimes deciduous. The food is chiefly vegetable, though some American species are known to suck eggs and destroy young birds. The family is very abundant in North America, nearly $\frac{1}{3}$ of all the species being found here; the prairie dogs and prairie squirrels are peculiar to this continent, as well as most of the flying squirrels. (See Flying Squirrel, Prairie Dog, and Prairie Squirrel.)—The genus *sciurus* (Linn.) is the type of those of the family which live in trees; the species of the United States are hard to determine from the tendency to variation in color (red, gray, and black being the predominating tints), and the diminution in size in the southern states. Mr. Baird states it as a general rule that, when a squirrel has the fur of the throat or belly annulated, it is a variety of some species which normally has the under parts uniformly white or reddish to the roots, or the latter plumbeous. The bones of the red-bellied squirrels are generally red, and of the white-bellied white. The largest of the North American species is the fox squirrel of the southern states (*S. vulpinus*, Gmel.), about 2½ feet long, of which the tail is 15 inches; the head is rather slender and pointed, and the tail rather cylindrical; the upper molars are permanently 4. The color varies from a gray above and white below, through various shades of rusty, to uniform shining black; the fur is coarse and harsh, and the ears short; the ears and nose are white in all its varieties. It is found from North Carolina through the S. Atlantic and gulf states to Brazos river in Texas. The gray variety is the *S. capistratus* (Bosc), and the black the *S. niger* (Linn.) and the black squirrel of Catesby. It prefers elevated and open pine ridges where there are occasional oak, hickory, and nut trees; the nest for the winter and breeding seasons is made in a hollow tree, and in summer in the forks between the branches. The young are born in March and April, being fed by the parents for 4 or 5 weeks. The food consists of acorns, nuts, fruit of the pine cones, green corn in the summer, buds and roots in spring, and whatever it can get in the winter, as it does not appear to lay up any winter stores, or to resort to any hoards previously buried in the ground. When alarmed, it makes for a hollow tree; it is a swift runner, defends itself boldly, and is very tenacious of life; it is generally seen toward the middle of the day; it is easily domesticated, but is less active in the cage than the smaller species; its flesh is frequently eaten. The cat squirrel (*S. cinereus*, Linn.), the fox squirrel of the middle states, is 25 or 26 inches long, of which the tail is about 14; the head is very broad, the muzzle short and catlike, the body thick and heavy, and the tail large and flattened; the color varies from light gray tinged with rusty above and white below to grizzly above and black below; it is never pure black; the ears are low and broad, and never white; the hair is less coarse and stiff than in the preceding species. It is found chiefly in the middle states, rarely in southern New England; it is rather a slow climber, and of inactive habits; it becomes very fat in autumn, when its flesh is excellent, bringing in the New York market 3 times the price of that of the common gray squirrel. The species called fox squirrel in the western and southwestern states (*S. Ludovicianus*, Harlan) has a very full and broad tail; it is rusty gray above and ferruginous below. The common gray squirrel (*S. Carolinensis*, Gmel., and *S. migratorius*, Aud. and Bach.) is about 22 inches long, of which the tail is 12; the upper molars are permanently 5. The general color is gray above and white below, with a yellowish brown wash on the back and sides; the region behind the ears has usually a white woolly tuft; there is a black variety, the *S. niger* of Godman. The ears are very high, narrow, and acute, the tail flattened, feet large, claws strong, thumb a rudimentary callosity; the palms naked, and soles mostly so in summer; whiskers longer than the head. It is found extensively over the United States, being much the smallest at the south; this difference in size and some modifications of the habits, according to climate and locality, have led authors to make two species, with the names given above, which Mr. Baird unites in one. It is a very active animal and an excellent climber, in the south preferring the low cypress swamps; it is often met with late in the evening and on moonlight nights, when it falls a victim to owls, foxes, wild cats, &c., as well as to hawks and snakes by day; the young are 4 to 6, born in May or June. They are easily domesticated, and gentle in confinement, and are often kept as pets in wheel cages; they do not lay up any great amount of winter stores, being partially torpid at this season and requiring but little food; they are very fond of nuts, and of green corn and young wheat, on which last account wars of extermination are often waged against them, whole villages turning out on an appointed day to hunt them, killing great numbers. At irregular periods they sometimes collect in large troops in the north-west, migrating eastward, crossing rivers and mountains, and committing great destruction in the fields in their course. Of late years many of this species have been domesticated in the public parks of northern cities; though pets of children and loungers, they drive away the birds by destroying their eggs and young. The California gray squirrel (*S. fossor*, Peale) is as large as the fox squirrel, but more slender; it is grizzled bluish gray and black above and white below; tail black, white on the exterior and finely grizzled below; back of ears chestnut. It represents on the west coast the gray squirrel of the east. It runs very swiftly on the ground, not readily taking to trees when pursued; like the other squirrels, it has a kind of bark; the food consists principally of nuts, which it sticks in holes of pine trees bored by woodpeckers, resembling pegs placed in the wood. The red or Hudson's bay squirrel (*S. Hudsonius*, Pall.) has a stout body 7 or 8 inches long, and the tail rather less, narrow and flat; ears moderate, broad, tufted at the tip. The color above and on the sides is a mixed black and grayish rusty, with a broad wash of bright ferruginous down the back and the upper surface of the tail; dull white below; tail rusty on the margin, within which is a narrow black band; there is often a black line on the flanks, separating the colors of the sides and belly; the soles are hairy or naked according to the season. It is found from high northern latitudes to the Mississippi, and throughout the northern and middle Atlantic states in elevated regions. It is active, graceful, fearless of man, cleanly, and industrious in laying up a winter supply of food; it sometimes makes its nest in outbuildings; it is very lively all winter, eating its supply of nuts, and the seeds of pines and firs; in cold climates it burrows in the ground at the foot of some large coniferous tree. It is called chickaree from its loud chattering note; its flesh is tender and well flavored; it is less gentle and easily tamed than the gray squirrel. The common European squirrel (*S. vulgaris*, Linn.), much resembling the last, is about 14 inches long, of which the tail is about ½; the color is reddish, chestnut brown on the back, white below, becoming gray in winter in the north, and yielding then the much prized fur called minever; the ears are tufted, and the hair on the tail is directed to the two sides. It is found throughout Europe and N. Asia; it feeds in summer on buds and shoots, especially the young cones of the pine, and in winter on a supply of nuts which it gathers in autumn and hides in some hollow tree. It is an excellent climber, and makes a nest of moss, leaves, and fibres very neatly interwoven, in a hole or fork of a tree, and well concealed; a pair live together, frequenting the same tree for many years; the young are born in June, and remain with their parents till the following spring; they remain torpid in the very coldest days. The largest of the squirrels is the Malabar squirrel (*S. maximus*, Schreb.), 33 inches long, as large as a cat; it is black above, the sides and top of head chestnut, and lower parts pale yellow; it lives in palm trees, feeding on the milk and meat of the cocoanut.—The ground squirrels (*tamias*, Illig.) have cheek pouches extending to the occiput and opening internally; the tail is shorter than the body, the feet large with well developed claws adapted for digging, and the anterior basal plate of the zygoma perforated by a nearly circular foramen; the permanent upper molars are 4, the tail is not bushy, and there are 3 to 5 longitudinal stripes on the back. They burrow in the ground near the roots of trees, and their nest is well supplied with winter food; they form a connecting link between the squirrels proper and the spermophiles or prairie squirrels. The common American ground, striped, or cheeping squirrel, chipmunk, or hackee, has the body 5 to 6 inches long, and the tail about 4½; on the back and sides are 5 longitudinal black stripes, not extending over the rump, the outer 2 on each side separated only by a white line; rump pale chestnut, and the upper parts generally finely grizzled yellowish gray and brown; lids and under parts white, and a downy white spot behind the ears; it is the *T. striatus* (Linn.). It varies but little, and is found from Canada and Lake Superior to Virginia and Missouri. It is lively, playful, and busy, and may be said to occupy among mammals the place of the wren among birds; it is very commonly seen running along the fences and walls in New England, cheeping like a young chicken, the cheek pouches distended with nuts or seeds, occasionally stopping and standing upright, watching against enemies, and disappearing in some hole at the least alarm. The young are born in May, 4 or 5 at a birth. They are hardly injurious to the farmer, not disturbing the grain before it is ripe, and only gleaning after the harvest; they feed chiefly on nuts, wheat, buckwheat, Indian corn, cherry stones, and grass seeds, with which their winter burrows are plentifully supplied. They are easily captured in traps, but are not readily tamed, and are rarely seen in cages; their worst enemy is the weasel, which pursues them into their burrows. The Missouri striped squirrel (*T. quadrivittatus*, Wagn.) is smaller, with the intervals between the stripes all grayish white; beneath it is dirty grayish white, and the general color is more ferruginous; it most resembles the *T. Pallasii* (Baird) of N. Asia and Siberia.

SQUIRREL CORN. See Dicentra.

SQUIRREL, Flying. See Flying Squirrel.

STAAL, Marguerite Jeanne Cordier de Launay, baroness de, a French writer, born in Paris in 1693, died June 15, 1750. She was educated by charity at a convent in Rouen; in 1710 she became chambermaid to the duchess de Maine at Sceaux, but soon attracted attention by her superior knowledge and abilities, having among her friends Fontenelle, Marivaux, Montesquieu, and Mme. du Deffand. Being an active agent in the conspiracy of Cellamare, she was arrested, and was for two years confined in the Bastile; she then resumed her situation at Sceaux, and afterward married an old Swiss officer, the baron de Staal, who was appointed commander of a company in the duke of Maine's guards, with the rank of major-general. She left personal *Mémoires*, and letters that are still sought for on account of their terseness and wit. The former have been frequently reprinted separately or in historical collections; the latter are found in her *Œuvres complètes* (2 vols. 8vo., Paris, 1821).

STABAT MATER, the first words of a celebrated Latin hymn of the church, generally sung on the festival of the seven sorrows of the Virgin, and during Holy Week. It was probably composed by Jacobus de Benedictis, commonly called Jacopone, a Franciscan friar, who flourished in the latter half of the 13th century; but the words have received several changes. It has been set to music by many of the most eminent composers, including Palestrina, Pergolesi, Astorga, Haydn, Neukomm, and Rossini. The composition of Pergolesi (for two voices with an accompaniment), commenced upon his deathbed and finished by another hand, is the most celebrated, although that of Rossini is the most popular in the concert room.

STADIUM (Gr. στάδιον), originally a Grecian course for foot races at the places where games were celebrated, and sometimes in the gymnasia of cities where there were no games. The most celebrated stadia were those at Olympia, Delphi, Thebes, Epidaurus, and the Panathenaic at Athens. The stadium was an oblong area terminated at one end by a straight line, and at the other by a semicircle, with ranges of seats rising above one another in steps around the circumference. The length of the stadium at Olympia was 600 Grecian feet, equal to 606 feet 9 inches English; and from continual reference to it as a comparison, this length became used throughout Greece as the standard of measurement for itinerary distances, and was subsequently adopted by the Romans, chiefly for nautical and astronomical measurement. From discrepancies in the distances recorded by Greek writers, it has been thought that different stadia were referred to; but such discrepancies probably arose from the distances in question being computed, and not measured. Thus, a certain number of stadia were allowed for a day's journey; one man would make the same journey in less time than another, and would record the distance as so many stadia less in proportion to this difference.

STADTHOLDER (Dutch, *stadhouder*, a city or state holder or keeper, a governor; Ger.

Statthalter), the title given by certain of the United Provinces of the Netherlands to William of Orange, who thereupon became the chief magistrate or president of those provinces and commander-in-chief of their forces. In 1587 Maurice, his 2d son, was appointed stadtholder of the United Provinces, and the dignity continued in the house of Orange, with occasional intermissions during which the states-general governed without a stadtholder, until 1747, when William IV., of a collateral branch of the Orange family, was declared hereditary stadtholder. After the restoration of the Orange family in 1814, the title was exchanged for that of king, which is also hereditary.

STAËL-HOLSTEIN, Anne Marie Louise Germaine (Necker), baroness de, a French authoress, born in Paris, April 22, 1766, died there, July 14, 1817. She was the only child of Necker, the wealthy Swiss banker and minister of finance to Louis XVI. Her early education, under the direction of her mother, was severe and systematic, and almost from infancy she was thrown into the society of the many distinguished persons who frequented the *salon* of Mme. Necker, whence she acquired the art of brilliant and thoughtful conversation, for which she was always remarkable. At the age of 20 she was married, through her mother's management, to the baron de Staël-Holstein, the Swedish minister to the French court—an alliance which, while it gave her rank and position in society, had little in the wishes or sympathies of the parties to recommend it. In 1788 appeared her first work of importance, *Lettres sur les ouvrages et le caractère de J. J. Rousseau*, which, notwithstanding an unreasonable admiration for her subject, contains a masterly exposition of some of the sophisms of the *Nouvelle Héloïse*. With the outbreak of the French revolution her imagination kindled at the prospect of political and social reform which seemed about to dawn upon the country. But gradually, as popular violence and fanaticism gained a place in the public councils, she employed her pen boldly in denunciation of the factious course of parties, and in defence of the royal family and others, whom she now considered the oppressed instead of the oppressors. Compelled during the reign of terror to leave Paris, she resided first at her father's estate of Coppet, Switzerland, and afterward at Richmond, England, in society with Talleyrand, the count de Narbonne, and other distinguished emigrants, some of whose lives she had saved at the commencement of that period. She returned after the establishment of the directory, and until the usurpation of supreme power by Napoleon made her saloons the rallying point of those who favored a compromise between monarchy and the principles of 1789, and looked with distrust upon the designs of Bonaparte. The latter, having attempted in vain to secure her support, finally ordered her to leave Paris, and not to remain within 40 leagues of the city. Passionately fond of the social attractions of the capital, and of the literary and fashionable celebrity which she there enjoyed, she obeyed with extreme reluctance the command of the first consul, and retired to Coppet, where she prepared for the press her novel *Delphine* (1802). She then travelled to Italy, her impressions of which country are recorded in *Corinne* (Paris, 1807), a work defective in plot and dramatic interest, but full of eloquent remarks on scenery, manners, and art, and unsurpassed as a poetical description of a poetical country. It has been repeatedly translated into every European language, and is still the work on which her literary reputation mainly rests. A subsequent residence in Germany, where she was intimate with Goethe, the Schlegels, and other eminent men, afforded the materials for her *De l'Allemagne*, which was in 1810 seized in Paris by the police, after 10,000 copies had been printed, notwithstanding it had passed the test of the French censorship. The emperor's hostility probably prompted this arbitrary act, although the authoress was informed by the minister, Savary, in answer to her remonstrance, that the publication had been stopped because "the work was not French." Being closely watched at her residence in Coppet after this, she succeeded in 1812 in making her escape to England, whither she was obliged to proceed by a tedious overland journey through Germany, Russia, and Sweden, the seaports being closely watched by the French. *De l'Allemagne* appeared in London in 1813. After the abdication of Napoleon she returned to Paris, and resumed her old position as a literary celebrity and a leader of public opinion. She passed through the Hundred Days unmolested by Napoleon, but after the second restoration retired to Switzerland, and seemed to have lost her interest in active politics. She travelled again to Italy in the hope of restoring her health, and, returning to Paris, busied herself with preparing for the press her last work, *Considérations sur la révolution Française*, published posthumously by her son in 1819 (3 vols. 8vo.). It is written with commendable temperance and impartiality, and is remarkable for graphic portraits of public men of the revolutionary period. Her friend Benjamin Constant observed that if she had painted individuals more frequently and more in detail, her work might have ranked lower as a literary composition, but would have gained in interest. She also wrote *De l'influence des passions* (1796); *De la littérature considérée dans ses rapports avec les institutions sociales* (1800); *Réflexions sur le suicide; Essai sur les fictions; Vie politique de Necker; Dix années d'exil*, an autobiographical narrative; and a variety of minor productions, some of which appeared posthumously. She was buried in the family tomb at Coppet, which bears the inscription: *Hic tandem quiescit, quæ nunquam quievit.* The baron de Staël-Holstein had died in 1802; and by the dispositions of her will it appeared that for several years previous to her death she had been secretly espoused to a young officer, M. de Rocca, by whom she had a son, the concealment of the marriage being due to her reluctance to part with a name so long identified with her literary fame. She left two children by her first husband, the baron Auguste de Staël, and Albertine, duchess de Broglie, both eminent for virtues and piety. The former edited the complete works of his mother in 18 vols. (Paris, 1820–'21), and a memoir of her was published by Mme. Necker de Saussure (8vo., Paris, 1821). In 1862 was published her inedited correspondence with the grand duchess Louisa of Saxe-Weimar, from 1800 to 1817 (8vo., London).

STAFF, in military science, a corps of officers attached to a commander for the purpose of assisting him in carrying his designs into execution. The staff of an army may be distinguished under 3 heads: 1, the general staff, consisting of adjutants general and assistant adjutants general, aides-de-camp, inspectors general and assistant inspectors general, &c., whose duties, apart from the communication of the orders of the general-in-chief, embrace the whole range of the service, whence their title of general staff officers; 2, the staff corps, whose duties are confined to distinct branches of the service, as the engineers, topographical engineers, ordnance, quartermasters', subsistence, medical, and pay departments; 3, the regimental staff, which includes regimental officers and certain non-commissioned officers, whose duties assimilate to those of adjutants general, quartermasters, and commissaries. The employment of a military staff, as a regular branch of the service, dates from the reign of Louis XIV.; but in European armies it cannot be said to have constituted a permanent corps until upward of a century later. The wars of the French revolution and of Napoleon were conducted by the French army without such a corps, the officers employed on the staff being detailed from the various arms of the service for that purpose, and returning afterward to their own regiments. The French have now however a special school for the instruction of staff officers, who form a permanent corps, and the same may be said of the principal military establishments of Europe. A permanent general staff is however discountenanced by some military authorities, who favor a system which admits of supernumerary general and regimental officers selected temporarily for staff duties by commanders of troops. Such a system has always prevailed in the army of the United States. "The leading qualifications," says Napoleon, "which should distinguish an officer selected for the head of the staff are: to know the country thoroughly; to be able to conduct a reconnoissance with skill; to superintend the transmission of orders properly; to lay down the most complicated movements intelligibly, but in few words and with simplicity."

STAFFA, a small uninhabited island of Scotland, one of the inner Hebrides, Argyleshire, 6 to 8 m. W. from Mull. It is of irregular elliptical form, about 1½ m. in circumference. Its surface is an uneven plateau, elevated from 50 to 144 feet above the sea, the upper rock being composed of a shapeless basaltic mass, with occasional small columns, resting upon a columnar basalt, hard, grayish black, compact, and of perfectly regular forms, which has for its foundation a conglomerate trap or tufa. This columnar basalt, strongly resembling architectural designs, is indented with numerous caves, of which the most remarkable is that known as Fingal's cave. It opens with a noble gateway, of an absolute height from the rocky floor to the top of the entablature of 117 feet 6 inches, and from the surface of the water at mean tide to the top of the arch inside of 66 feet, and nearly 54 feet in breadth. The sea at all times flows into the cave, and has at the entrance a mean depth of 18 feet, but at the inner terminus shoals to 9 feet. The action of the waves has broken a number of the columns at the entrance. Sir Joseph Banks measured the depth of the cave from the entrance to the terminus, and found it 371 feet 6 inches, but it is now reckoned as only 227 feet. For the whole distance the sides of the cave are supported by massive columns of basalt, usually pentagonal or hexagonal, but sometimes with 7 or 9 sides, and very rarely triangular or rhomboidal, 2, 3, or 4 feet in diameter; from the roof depend, for the whole length of the cave, clusters of columns, whitened with calcareous stalactites and sparkling with innumerable crystals. The whole cave is lighted from without, so that the furthest extremity is plainly distinguished, and the air is said to be dry and wholesome. The basaltic columns, which form the façade of the entire island, are found in all positions, erect, oblique, horizontal, and curved or bent. The other principal caves are the Boat cave, the Cormorant cave, so called from the number of these birds which visit it, and the Clam Shell cave, which derives its name from the peculiar form in which the basaltic columns are inclined, giving it the appearance of a shell of the genus *pecten;* it is 30 feet high, 16 to 18 feet broad, and 130 feet long.

STAFFORD, an E. co. of Virginia, bordering on the Potomac, bounded S. W. by the Rappahannock, and drained by Aquia and other creeks; area, 335 sq. m.; pop. in 1860, 8,555, of whom 3,314 were slaves. The surface is hilly, and the soil along the Potomac is moderately fertile. The productions in 1850 were 178,651 bushels of Indian corn, 58,923 of wheat, 38,750 of oats, and 2,018 tons of hay. There were 2 cotton factories, 5 grist mills, 2 saw mills, 12 churches, and 245 pupils attending public schools. Gold has been discovered, and granite and freestone of an excellent quality are found. The Richmond and Fredericksburg railroad intersects the county. The value of real estate in 1856 was $1,695,768, showing an increase of 32 per cent. since 1850. Capital, Stafford Court House.

STAFFORD, Henry, duke of Buckingham. See Buckingham, Dukes of.

STAFFORD, William Howard, viscount, an English statesman, born Nov. 30, 1612, executed on Tower hill, Dec. 29, 1680. He was the 2d son of Thomas, 20th earl of Arundel, the well known collector of the Arundelian marbles; and upon the death without issue of his brother-in-law Henry, 4th Baron Stafford, he succeeded in having the dignity conferred upon himself in right of his wife, who was at the same time created Baroness Stafford. In Nov. 1640, a few months later, he was created Viscount Stafford. He was brought up in the Roman Catholic faith, and adhered during the civil wars to the royal cause; but after the restoration, conceiving that he had not been rewarded according to his deserts, he was frequently found in opposition to the court, although he appears never to have played an important part as a legislator. He was, however, of sufficient prominence to be singled out by Titus Oates, the contriver of the "popish plot," as one of his chief victims. On Oct. 23, 1678, Oates deposed before the house of commons that upon the subversion of the kingdom by the Jesuits, Lord Stafford was to have the appointment of paymaster of the army; and on the 30th the accused nobleman was committed to the tower, with other Catholic peers against whom similar charges had been preferred. After lying two years in prison, he was brought to trial on a charge of high treason before his peers on Nov. 30, 1680, his 69th birthday. During a trial of 7 days he defended himself with an ability for which no one had given him credit; pointing out with such skill the weakness of Oates's evidence, that Evelyn, who was present, thought "such a man's testimony should not be taken against the life of a dog." But, as Dugdale and Tuberville, the other witnesses for the government, swore positively that Stafford had incited them to assassinate the king, a verdict of guilty was pronounced by a vote of 55 to 31. He was executed 3 weeks afterward; and such was the revolution in popular feeling which set in subsequent to his conviction, that, although he had been assailed by invective on the day of his trial, when he protested his innocence on the scaffold the spectators cried: "We believe you, my lord. God bless you, my lord." His eldest son was created earl of Stafford, which title expired with the 4th earl in 1762; and in 1825 (the attainder of Lord Stafford having been reversed in the previous year) his descendant Sir George William Jerningham succeeded to the barony of Stafford.

STAFFORDSHIRE, an inland and nearly central county of England, bounded by the counties of Chester, Derby, Leicester, Warwick, Worcester, and Salop; area, 1,250 sq. m.; pop. in 1861, 746,584. The principal towns are Stafford, the capital, Lichfield, Walsall, Wolverhampton, Dudley, Tamworth, Burton-upon-Trent, Uttoxeter, Cheadle, Hanley, Burslem, and Newcastle-under-Lyme. The chief river is the Trent, which traverses the county in a N. W. direction, and has several considerable tributaries. Much of the surface consists of moorlands, elevated in some places 1,000 feet above the level of the sea, running in ridges separated by valleys sloping toward the Trent; the land in the valley of the Trent is good. Staffordshire is an important manufacturing county, and coal, iron, copper, and lead mines are worked extensively. The leading manufactures are iron, hardware, and earthenware, of which last it is the chief seat in England, and which gives name to a division of the county called the Potteries. There is perhaps no article of ironmongery or hardware which is not produced in Staffordshire. The pottery works established by Josiah Wedgwood, and still carried on by his descendants, are in this county. The ale breweries of Burton-on-Trent are very extensive and celebrated. Staffordshire is connected with the surrounding counties by a perfect network of roads, canals, and railways. There are some remains of Roman antiquities. The county sends 4 members to parliament, beside 13 for the boroughs.

STAG, the common name of the red deer of Europe (*cervus elaphus*, Linn.) and its congeners. It is about 4 feet high at the shoulders, and of a general reddish brown color, tinged with grayish in the winter; on the rump is a pale spot extending a little above the tail; there is a blackish dorsal line, and on each side often a row of pale fulvous spots; the hair is brittle, and in old animals forms a kind of mane on the neck; the tail is moderate, the tear bag well developed, suborbital pit large, and the hoofs narrow, triangular, and compressed. The antlers are large and rounded, with an anterior basal and a median anterior snag, and the apex divided into 2 or more branches according to age; they are peculiar to the males, shed in the spring, and reproduced, sometimes to a weight of 24 lbs., by August. (For family characters see Deer.) It is a strong, swift, and vigilant animal, with a very acute sense of smell; it was formerly found in herds in the forests of the mountainous regions of temperate Europe, but is now rare except in the least inhabited parts, like the highlands of Scotland, where stag hunting is still a favorite sport with the privileged few. This in old times constituted the noble art of *venerie*, as distinguished from the more plebeian chase of the fallow deer and other species which resort to the plains more than the woods. Gestation continues 8 months; the young or calf is dropped in May, and is yellowish with white spots; the male is called a stag or hart, and the female a hind, the terms buck, doe, and fawn belonging properly to the fallow deer (*dama vulgaris*, Gesn.); the venison is coarser than that of the fallow deer. It has been found fossil, with bones of the elephant and other pachyderms, in the Kirkdale cavern, the peat bogs of Ireland, and similar recent formations. It is represented in North America by the larger wapiti (*C. Canadensis*, Erxl.). (See WAPITI.) Other stags in the old world are the Barbary (*C. Barbarus*, Benn.), of N. Africa, of a dark brown color with back of haunches and obscure spots white; and the Nepaul (*C. Wallichii*, Cuv.), brown, with a large white spot on the rump. Others are found in India and Japan.

STAG BEETLE, the common name of the family *lucanidæ*, of the lamellicorn pentamerous coleoptera, of which the type is the genus *lucanus* (Linn.). Many of the species are of considerable size, and have received their name from the large and powerful mandibles with which the males are furnished. The stag beetle of Europe (*L. cervus*, Linn.) is 2 inches long, exclusive of the mandibles, and is the largest and most formidable of the British beetles; the color is black, with brown elytra; the head is wider than the body; the mandibles corneous, arched, with 3 large and several smaller teeth, and used as instruments of offence; antennæ bent, pectinated, and 10-jointed, tibiæ dentated along outer edge, and the tarsi ending in 2 hooks. They live in the trunks of trees by day, flying abroad at night, often into houses, where their sharp and stag-like horns cause no little alarm; the females are smaller, with narrower head and much shorter mandibles. They are also called horn beetles and flying bulls. According to De Geer, they feed principally on the sweet juice spread over the leaves of the oak and exuding on the bark, which they obtain by means of the brushes of the under jaws; they are said to seize caterpillars and soft-bodied insects, and to suck their juices; they are very strong, and can pinch the finger pretty hard, but do not use their mandibles in this way unless provoked, and their punctures are not poisonous; they live only a short time in the perfect state, perishing soon after laying their eggs in the crevices of bark near the roots of trees. The larvæ are large and fleshy grubs with very thick body, arched, 13-ringed, and having a brown scaly head armed with 2 strong jaws with which they gnaw wood, reducing it to a coarse powder, and often doing much damage by boring into the trunks and roots of oaks and beeches; there are 6 scaly feet, attached to the first 3 rings; they are said to be 6 years in coming to their growth, and by some are regarded as the *cossus* of the Romans, a worm-like grub, according to Pliny, obtained from the oak and considered delicious food, but not coveted by modern epicures. The largest of the New England species is the *L. capreolus* (Linn.), usually called horn bug; it is about 1¼ inches long, without the mandibles, the latter being sickle-shaped and toothed; the color mahogany brown, smooth and polished. They appear in July and August. The larvæ are 3 inches long when full grown, straw-colored, with yellow head, brown jaws, and 9 stigmata; they live in the trunks and roots of apple trees, willows, and oaks, and are sometimes injurious.

STAGNELIUS, ERIK JOHAN, a Swedish poet, born in the island of Oland, Oct. 14, 1793, died April 3, 1823. He was the son of a parish priest, afterward made bishop of Calmar, and received his education at the universities of Lund and Upsal. In 1815 he became a clerk in the Swedish office for ecclesiastical affairs, which position he held until his death. He died prematurely from excessive drinking. His poetical writings, including many in manuscript, were edited in 1824 by his friend Hammarsköld in 3 vols., and comprise epic or narrative poems, dramas, lyrics, ballads, and miscellaneous minor pieces. His reputation has greatly increased since his death, and he is now ranked among the Swedish classics. His entire works have been translated into German, and specimens of his poems are given in Howitt's "Scandinavian Literature."

STAHL, GEORG ERNST, a German chemist and physiologist, born in Anspach, Oct. 21, 1660, died in Berlin, May 14, 1734. He studied medicine at Jena, and became a lecturer there in 1684, professor of medicine, anatomy, and chemistry at Halle in 1694, and royal physician at Berlin in 1716. Professing as a pietist a disdain for all learning, he was yet the author of two theories prominent in the history of science. In his *Theoria Medica Vera* (Halle, 1707; new ed. by Choulant, 3 vols., Leipsic, 1831-'3; translated into German by Ideler, 3 vols., Berlin, 1832-'3) he supposed the existence of an *anima* or immaterial principle resident in the body, creating its organization, and governing all its processes with reference to the final purpose of preserving life. Every corporeal movement, he said, is the product of a spiritual order. He invented also the phlogistic theory, which prevailed till the time of Lavoisier, in development and defence of which he published *Zymotechnia Fundamentalis* (1697), *Experimenta et Observationes Chemicæ* (1731), and numerous dissertations.

STAHL, JULIUS FRIEDRICH, a German statesman and author, born in Munich, Jan. 16, 1802, died at Brückenau, near Kissingen, Aug. 10, 1861. The name of his parents, who were Jews, was Schlesinger, but he adopted the name Stahl when in 1819 he was baptized into the Protestant church. He studied law, was appointed in 1827 *Privatdocent* in the faculty of law at Munich, in 1832 extraordinary professor at Erlangen, and in the same year ordinary professor at Würzburg. In 1840 he accepted a call to the university of Berlin. In 1848 he founded with Bethmann-Hollweg the German church diet, of which he was vice-president until 1859, when a disagreement between the evangelical (low church) and the high Lutheran parties, of which latter he was the leader, led him to resign. In 1854 the king appointed him syndic of the crown, and a life member of the *Herrenhaus* (house of lords).

He was also appointed in 1852 a member of the supreme ecclesiastical council of the Prussian state church, which position he retained until 1858, when he resigned. In politics he opposed with great vigor and talent the spread of democratic principles. His most important work is *Philosophie des Rechts* (2 vols., Heidelberg, 1830–'37), in which he develops his famous theory of a "Christian state," which, according to him, is to aid the church by the secular arm in extending the dominion of Christianity, and in realizing its mission upon earth. In his work *Die Kirchenverfassung*, &c. (Erlangen, 1840), he declared himself in favor of an episcopal form of church government. In 1855 he had a controversy with Chevalier Bunsen, which, on account of the talent displayed on both sides, attracted general attention in literary circles. His last great work was *Die Lutherische Kirche und die Union* (Berlin, 1859).

STAHR, Adolf Wilhelm Theodor, a German author, born in Prenzlau, Oct. 22, 1805. He was educated at Halle, and taught there till in 1836 he was invited to Oldenburg as professor in the gymnasium. He was chiefly occupied with the history and criticism of Aristotelianism, and published works thereon. An Italian journey furnished the subjects of *Ein Jahr in Italien* (3 vols., Oldenburg, 1847–'50; 2d ed., 1853), and of a historical romance entitled *Die Republikaner in Neapel* (3 vols., Berlin, 1849), characterized by a German critic as a "poetical lava of rustic, martial, and revolutionary scenes." He has also written other æsthetic and historical works. He married the authoress Fanny Lewald in 1854, and settled in Berlin.

STAIR, Lord. See Dalrymple.

STALACTITE (Gr. *σταλαζω*, to drop, to drip), and **Stalagmite** (Gr. *σταλαγμος*, dripping, dropping), concretions of limestone formed by the water that percolates through fissures in the roofs of caves, carrying carbonate of lime in solution, which is left behind as the water evaporates. The collections thus formed on the roof itself and extending downward from it like icicles are called stalactites; those produced by the drippings upon the floor, and which rise in the form of mounds toward the roof, are called stalagmites. It is often the case that the two meet and form pillars, and sometimes broad sheets when the dripping follows a fissure in the roof or seams of stratification. In parts of Weyer's cave in Virginia the stalactites may thus be seen in parallel rows starting along the lines that mark the divisions between the steeply inclined strata in the roof; and in certain places lines of sheets are produced which reach from the roof to the floor. Some of them are so thin as to be translucent, and when struck produce a ringing sound. The cave of Adelsberg in Carniola is famous for the variety of its stalactitic forms, and among them are some remarkable examples of this character. The stalactites are seen hanging in thin, transparent white sheets like linen, and one in particular is called the "curtain" from the striking resemblance in its flexures to the folds of a loose pendent sheet. Most of the grotesque figures in caves that give to these their chief interest, and suggest innumerable strange resemblances, are due to the varying forms of the groups of stalactites. In one place the pillars stand like trees in a grove; in another they suggest long colonnades and verandahs adorned with Gothic tracery; again they hang over the edge of a precipitous wall, resembling falling waters arrested in their course and turned into stone; and with every advancing step they present new and strange varieties. They are white and translucent like alabaster when the limestone that supplies their material is pure and white; but if this contain impurities, these are also taken along and deposited with the carbonate of lime. Thus are produced the various colors frequently seen in stalactites, and the concentric veins around their central axis which are brought to view in exposing a cross section by fracture. The common shapes of small stalactites are more like those of icicles, but in the interior the former are usually hollow for a foot or more from the upper end. This results from the water before it falls first evaporating around the outer edge of the drop or collection of drops, and thus causing the deposit of a ring of stony matter. Down the outer side of this more water gathers, continually adding new rings below, the cavity gradually contracting and finally terminating in a point. The upper portion gains in size by the partial evaporation of the water that flows down it, and thus the bluntness of the cone is increased. In places where the wind sweeps through the caves the regularity of the deposit is disturbed.

STALLBAUM, Johann Gottfried, a German scholar and educator, born at Zaasch, Sept. 25, 1793. He was educated under Beck and Hermann at Leipsic, where he has been a teacher since 1820, and extraordinary professor in the university since 1840. He has published a highly esteemed critical edition of Plato (12 vols., Leipsic, 1821–'5), has edited several of the dialogues separately, and is the author of the introductions and annotations to Plato in the *Bibliotheca Græca* (9 vols., Gotha, 1827 *et seq.*). He has also edited Ruddiman's *Institutiones Grammaticæ Latinæ* (2 vols., 1823), Eustathius (5 vols., Leipsic, 1825–'30), and Terence (6 vols., 1830–'31); and he has written several treatises on education.

STAMEN, an essential organ in the inflorescence of phænogamous plants. The stamen consists normally of the filament and the anther, and where the corolla is present the stamens are situated immediately within it. Morphologically the stamen is a modified leaf, the filament being the midrib or petiole and the anther the blade or lamina. The anther is a closed receptacle secreting within itself a multitude of globules or grains of dust known as the pollen (see POLLEN), and which are employed in the fecundation of the ovary. The stamen is subject to many modifications, and is reducible in its simplest form to mere pollen masses, as occurs in certain natural orders.

STAMFORD, a township and village of Fairfield co., Conn., lying near the mouth of Mill river, 40 m. S. W. from New Haven, and 36 m. N. E. from New York; pop. in 1860, 7,185. The New York and New Haven railroad traverses the village and the S. part of the township. There is a canal 180 rods long, 80 feet wide, and 7 feet deep, from the village to the bay, between Greenwich and Shiphan points. The township is drained by Mill and Miannus rivers. It has considerable coasting trade, and large manufactories of iron ware, wire, boots and shoes, dye stuffs, coal oil, carriages, woollen, and clothing. It is a favorite residence, especially in summer, of merchants and others engaged in business in New York. The village has a bank, a savings bank, a weekly newspaper, and 7 churches.

STAMMERING, a term generally applied to all kinds of defective utterance; a more exact use of language would, however, restrict it to the organic or symptomatic defects, in distinction from stuttering, which is properly an idiopathic or functional difficulty. Both stammering and stuttering may nevertheless be treated under the common title. The causes which lead to stammering are usually, though not always, organic; harelip, cleft palate, elongation of the uvula, enlargement of the tonsils, a deficiency or unusual position of the teeth, tumors of the tongue or cavity of the mouth, and inflammation or ulceration of the parotid glands, are the most frequent of these causes. Where the defect results from functional disturbance, its principal causes are general debility, paralysis either local or general, tetanic or other spasms; a rheumatic or neuralgic affection of the muscles of the face, jaw, tongue, lips, &c., or of the vocal cords; a condition of intoxication; chorea; or in some cases a habitual imitation of stammering. Stuttering, on the contrary, is seldom or never organic. The stutterer is often in perfect health, and the vocal organs are not in any way diseased or deformed. His difficulty consists in the momentary inability to pronounce certain words or syllables. The stoppage of sound usually takes place at the first syllable, though occasionally at the second or third. Words beginning with *k*, *t*, *g*, *d*, *p*, *b*, or *m*, usually give the stutterer the most trouble, because they require the closing of the lips or the pressing of the tongue against the roof of the mouth for their enunciation, and an immediate reopening for the vowel which follows; while he keeps the lips closed, and compresses the cavity of the mouth in the attempt to force out the sound. Most stutterers can sing without difficulty, the action of the vocal organs being much less frequently interrupted in singing than in speaking. Stutterers may be classed under two heads, mental or psychical and physical. The first class are influenced favorably or unfavorably by whatever affects their mental state. Under the stimulus of pleasant or joyful emotions, they experience little difficulty in conversation; under depressing influences, their utterance is seriously disturbed. The physical stutterer is rendered worse by unpleasant weather, great fatigue, vicious indulgence, and the excessive use of tobacco or alcoholic drinks. Among the causes of stuttering may be named abnormal excitability of the nervous system, diffidence, fear, and other kindred mental emotions; affections of the brain and spinal cord; and the involuntary imitation of chorea and ecstasy. Whatever tends to lessen the control of the individual over his muscles and nervous system will of course increase stuttering; and whatever develops the power of the will over the body will lessen it. The number of bad stammerers is estimated by Colombat at 1 in 5,000; but the number who suffer in a greater or less degree from defective utterance is certainly not less than 1 in 500. Only about $\frac{1}{10}$ of these are females.—The proper treatment of either stuttering or stammering is indicated by the cause which induces it. In the case of the stammerer there should be a thorough investigation for an organic cause, which if possible should be removed. Hence, the clipping of the uvula, the removal of a portion of the tonsils, or the excision of a wedge-shaped piece from a tongue too large for the mouth, the use of electrical or other remedies for the cure of paralysis, the cauterization of ulcers in the mouth, the removal of irregular or the insertion of false teeth, and the administration of tonics for debility, have each resulted in the cure of cases of stammering; but no one of these will answer for all or perhaps a majority of cases. In stuttering also, the cause, when ascertained, will indicate to some extent the method of cure. Temperance and abstinence from indulgences which affect the nervous system are of course necessary. The muscles must be educated to uniform obedience to the will, and the will trained to steady and intelligent control over the muscles and nerves. A course of lessons in enunciation, by a capable teacher, will often effect a complete cure. In the case of the stupid or volatile, this training must be long continued, if it is to effect any permanent improvement. The various remedies which have been proposed, most of which have had a temporary but none a general and permanent success, would form an interesting chapter in the history of charlatanism. Dr. J. M. Warren of Boston lays down the rules that treatment for impediments of speech should be commenced between the ages of 8 and 12; and that "little permanent advantage will be gained, in the majority of cases, unless the treatment be resolutely persevered in for one or two years."

STAMP ACTS, laws for the raising of revenue by requiring the use of paper or parchment bearing a government stamp for various legal and other purposes. Such laws were introduced into England, in the reign of William and Mary, from Holland, and from that time to the present have multiplied, until now all or nearly all legal or commercial instruments are embraced within their requirements, as well as many things which cannot be thus described; as newspapers, legacies (by means of stamped receipts), and admission to practice as a physician, advocate, barrister, or attorney. So notaries public, bankers, pawnbrokers, and others must pay for a yearly license, which is given them on stamped paper or parchment. The provisions of these acts have varied very much from time to time. When the government stood in especial need of money, they were extended more widely, and the revenue from them increased. At present these acts are milder than formerly; but it is scarcely possible at this day to pursue any business, or enter into transactions, in England, without paying a tax to the government through a stamp. It is impossible to give here even a selection of the principal matters requiring stamps, and still less to enumerate them, the list in the recent consolidated acts covering more than 100 pages. The lowest amount noticed is one penny for a receipt of money over £2, and the highest is £22,500 on letters of administration on £1,000,000 property. The rate per centum varies considerably, being as a rule highest on the larger sums, but seems to be, in general, from less than one quarter of one per cent. to one per cent. The stamps are impressions made upon paper by the proper officers of government. If the instrument be written on parchment, the impression is attached to it. In a great number of cases, the instruments in blank and already stamped are bought at the stamp offices. In others, the instrument when properly prepared is brought to the office and stamped. The impression always states the price of the stamp, and sometimes the character or purpose of the document. It is obvious that such impressions may be easily forged, and it is said that they have been to a considerable extent. To prevent it, this forgery was made a capital offence by the act of William and Mary, and remained so until about 30 years ago, when the punishment of death was changed to that of transportation. An escape from the requirements of the acts is easily and certainly prevented by the provision that no document which needs a stamp and is without one can be offered in evidence or has any legal force whatever. And while the courts, regarding the stamp acts as penal instruments, apply to them the common rule of a strict interpretation against the act, they seem nevertheless to oppose and prevent the admission or use of any instrument so constructed as to evade payment of the duty; and the acts generally impose a penalty upon any evasion of their provisions.—As it is the purpose of the acts to raise a revenue in this way, they have multiplied, perhaps unnecessarily, the number of the documents required to give validity to a transaction; and questions of this kind are frequently before the courts. Thus, if the terms of a stamped agreement are varied, there must be a new stamp; and an affidavit used in one stage of a suit, if offered for use in a later stage, must be restamped. When the instrument may lawfully be stamped after it is executed, sufficient time is allowed; 21 days, for example, in an agreement not under seal. If a stamped instrument is lost, or withheld by an opposing party, an unstamped copy may be used in evidence. So a witness may use an unstamped receipt or other instrument to refresh his memory. If stamps are spoiled so that they cannot be used, they may be returned to the office, and will be paid for, in the absence of all fraud. While the acts, and the courts in their construction and application of them, aim at effectually preventing all fraud upon the revenue, they endeavor, so far as this is consistent with the safety of the revenue, to prevent fraud or injustice from the accidental and unintentional violation of the stamp acts. For this purpose many instruments erroneously believed to be properly stamped, or accidentally prevented from being so, may be subsequently stamped and thus acquire legal validity. Our readers will not forget that the endeavor of England to impose stamp duties upon her transatlantic colonies in 1765, was among the efficient causes of the revolution which resulted in their independence.—Stamp acts, or analogous enactments, are widely used on the continent of Europe. In some countries, as in France, stamps appear to be used as well for the authentication of legal documents as for the purpose of revenue; and it is said that an important part of the income of the city of Paris is derived from this source. —This indirect method of raising a revenue has been much and earnestly discussed, and there are, of course, conflicting opinions as to its propriety or utility. It seems however to be too firmly established to be shaken. They who favor it generally rest their approval on the following grounds. It is easily collected, at small cost. It cannot be evaded without great difficulty, and not to any great extent. By a careful discrimination it may be made to lay upon all business transactions an equal or proportional burden. This burden is borne by none but those who profit by the transactions upon which it rests; and while a poll tax must necessarily bear no proportion to the payer's means, and a property or income tax is always open to evasion or fraud to a great extent, and an excise on manufactured articles is very often cumbrous, expensive, and inconvenient, the impost levied by means of the stamp acts serves to produce a large revenue with a great impartiality, and a less cost and embarrassment than perhaps any other form of taxation now practised by civilized nations. The produce of stamp duties in Great Britain for 1860 was £8,285,257 14*s.* 4*d.*

STANDARD, the most considerable banner of an army, or the national banner when displayed in the field, on public occasions, or at sea to distinguish the ships of one nation from those of another. In common parlance the term is synonymous with banner, flag, ensign, or colors. For some time previous to the revolutionary war, and even after the declaration of independence, a variety of flags were displayed in the revolted colonies of British America, emblematic of the popular grievances and of the particular arm of service. Frequent mention is made of union flags in the newspapers of 1774, but, from the absence of any description of the devices employed, it has been supposed that they were the common ensigns of the commercial marine, in which were blended the crosses of St. George and St. Andrew in commemoration of the union of England and Scotland. In March, 1775, a union flag with a red field was hoisted upon the liberty pole in New York, with the inscription: "George Rex, and the Liberties of America." The Connecticut troops bore upon their standards and drums the arms of the colony, with the motto: *Qui transtulit sustinet;* and by act of the provincial congress the standard of each regiment was distinguished by its color, as "for the seventh, blue; for the eighth, orange," &c. The flag displayed by Gen. Putnam on Prospect hill near Boston, July 18, 1775, was red in token of defiance, and bore on one side the motto of Connecticut, and on the other the words: "An Appeal to Heaven," which were adopted by a resolution of the provincial congress of Massachusetts, April 29, 1776, as the motto to be borne on the flag of the cruisers of that colony—"a white flag with a green pine tree." The first American flag unfurled in South Carolina, "a blue ground with a white crescent in the dexter corner," was designed by Col. Moultrie at the request of the council of safety, and was carried at the taking of Fort Johnston, Sept. 13, 1775. By a letter of Col. Joseph Reed, Oct. 20, 1775, it appears that the flag of the floating batteries was similar to that of the Massachusetts cruisers. The standard of the first American fleet was hoisted at Philadelphia, Dec. 22, 1775, by Paul Jones with his own hands, as Commodore Ezekiel Hopkins embarked on board his flag ship, the Alfred; it represented a rattlesnake on a yellow field, with the motto, "Don't tread on me"—a device suggested probably by the head pieces of many of the newspapers in the revolutionary interest, in which a disjointed snake divided into 18 parts, with the motto, "Join or die," was employed to typify the necessity of union. When this result had been accomplished, the device was changed into a united snake or into a rattlesnake about to strike. A paper attributed to Dr. Franklin gives an elaborate explanation of the reasons for selecting this device, founded upon the character and habits of the rattlesnake. The fleet did not sail from the Delaware capes until Feb. 17, 1776, when it carried the flag known as the "Great Union," which was first displayed by Washington upon the heights before Boston, upon assuming the command of the newly organized army of the colonies, Jan. 1, 1776, and which consisted of the crosses of St. George and St. Andrew on a blue ground in the upper corner, with a field composed of alternate horizontal stripes of red and white, to indicate the union of the colonies for the maintenance of their rights within the empire of Great Britain. The combination of these two colors was probably suggested by the red flag of the army and the white one of the navy, previously in use, and the form of stripes by the order of Washington that officers of different grades should wear stripes of different colors "to prevent mistakes," and to enable "both officers and men to make themselves acquainted with the persons of all officers in general command." The emblems of British union having become inappropriate after the declaration of independence, it was ordered by congress, June 14, 1777, "that the flag of the 13 United States be 13 stripes, alternate red and white; that the union be 13 stars, white in a blue field, representing a new constellation." It is not known precisely to whom is due the credit of suggesting the stars for the union. The idea is supposed to have emanated from John Adams, who was then chairman of the board of war; and it has also been urged with considerable plausibility that the stars and stripes of the national standard were borrowed from the coat of arms of the Washington family, the shield of which presents a white or silver field traversed by two red bars, with three spur rowels or stars in the upper portion. The resolution of June 14 was not made public until Sept. 3, 1777, and the stars and stripes first figured conspicuously at the surrender of Burgoyne in the succeeding month; in December of the same year they were carried to Europe by Paul Jones on his ship, the Ranger. The flag, having been instituted on the representative principle, to designate the states of the united republic, remained unaltered until 1794, when, on motion of Mr. Bradley, senator from Vermont, which state, with Kentucky, had recently been admitted into the Union, it was resolved that from and after May 1, 1794, "the flag of the United States be 15 stripes," and that "the union be 15 stars," &c. The act of 1794 contained no provisions for future alterations, and until 1818 none were made, notwithstanding that in the mean time the states of Tennessee, Ohio, Louisiana, Indiana, and Mississippi were added to the Union. On the admission of Indiana in 1816 a committee was appointed, on motion of Mr. Wendover of New York, "to inquire into the expediency of altering the flag," by whom the whole subject was carefully examined. The proposition to carry out the principles of Bradley's act of 1794, which contemplated the addition of a star and a stripe for each state admitted into the Union, was deemed objectionable on the ground that nothing would be left to recall the past; and by a similar course of reasoning a return to the 13 stars and 13 stripes prescribed by the act of 1777 was considered equally impracticable, as the past would then only be recognized and the present ignored. The flag of 1794 was, if possible, more objectionable than either of these. The credit of establishing the device finally agreed upon, and which is intended to illustrate at once the origin of the republic and its progress in material prosperity, is due to Capt. Samuel C. Reid of New York, who gained distinction by his defence of the private armed brig General Armstrong against a greatly superior British force at Fayal in Sept. 1814; and his suggestions were embodied in the report of the committee submitted Jan. 2, 1817. This proposed to retain the 13 stripes, alternate red and white, in commemoration of the 13 colonies which took the field in the struggle for independence, and to make the number of the stars (white on a blue field), representing the Union, correspond with that of the states, with the provision that a new star should be added on the 4th of July next succeeding the admission of any new state. A bill embodying these provisions was also reported, but the subject having been laid over until the next congress owing to press of business, a new committee reported through Mr. Wendover a bill identical with the former, which on April 4, 1818, became a law. The flag thus established was first hoisted over the hall of representatives at Washington on the 13th of the same month at 2 P. M., although, in accordance with the act, its legal existence could not be recognized until the 4th of July ensuing; and down to the present time it has continued to be the national standard of the American Union. Resolutions were introduced in the 35th congress offering the thanks of the nation to Captain Reid "for having designed and formed the present flag of the United States," but were overlooked amid the exciting questions which subsequently occupied the attention of the national legislature.

STANDISH, Miles, the first military leader of the Plymouth settlers in New England, born in Lancashire, England, about 1584, died in Duxbury, Mass., Oct. 3, 1656. He came to Plymouth with the first company in 1620, previous to which he had served in the army in the Netherlands. He was a man of great courage, energy, and determination, with a fiery temper, and rendered important services to the early settlers. He commanded frequent expeditions against the savages that annoyed the settlements, and by the boldness and skill of his attacks inspired them with great awe of his military prowess. He visited England in 1625 as an agent for the colony, and after his return settled at Duxbury, and for the remainder of his life held the office of magistrate or assistant for that town.

STANFIELD, Clarkson, an English painter, born in Sunderland about 1798. In early life he followed the sea, acquiring thereby a knowledge of marine scenery. He was afterward distinguished as a theatrical scene painter, became an exhibitor in the galleries of the British institution and the society of British artists, and in 1832 he was elected an associate of the royal academy, and in 1835 an academician. His works comprise almost every kind of landscape, but as a painter of sea pieces he enjoys a unique reputation. Among his pictures of this class are views in and about the chief cities of the Italian coast, and the coasts of Normandy, Holland, and England. As an imaginative painter in the same department he has produced many striking works, including his "Wreck of a Dutch East Indiaman on the Coast of Holland;" "The Victory, bearing the Body of Nelson, towed into Gibraltar;" "The Abandoned," the sentiment of which Ruskin characterized as "very grand;" and "The Battle of Trafalgar." He has occasionally attempted with success a very different class of subjects, familiar examples of which are "The French Troops fording the Magra," "The Battle of Roveredo," "The Pyrénées," and "St. Sebastian during the Siege under the Duke of Wellington." He has been a prolific designer for illustrated works, and has published a series of lithographic copies of his sketches, "The Moselle, the Rhine, and the Meuse" (fol., 1838). He is perhaps the most popular of living English landscape painters.

STANFORD, John, D.D., an American clergyman and philanthropist, born at Wandsworth, England, Oct. 20, 1754, died in New York, Jan. 14, 1834. He studied medicine for a time, but engaged in teaching at Hammersmith, near London. He had been brought up in the church of England, but united with the Baptist church, and in 1786 emigrated to the United States, spent a few months at Norfolk, Va., and then opened an academy at New York. In 1787 he became pastor of the first Baptist church, Providence, R. I., and while there wrote a history of that church. In Nov. 1789, he returned to New York, and again became a teacher; and in 1791 he commenced a course of Sunday evening lectures. A Baptist church having been formed through his exertions in 1794, he served in connection with his other duties as its pastor for the next 6 or 7 years. He continued teaching till 1813, when he finally relinquished his school. In 1808 he preached for the first time in the almshouse, and in 1811 became the chaplain of that institution. His field of labors ultimately embraced the prisons, hospitals, and charitable asylums of the city. He also gave instruction to classes of theological students. Beside the "History of the First Baptist Church of Providence," already mentioned, Dr. Stanford was the author of numerous tracts and small religious works, and published a number of addresses and discourses, and a collection of essays entitled "The Aged Christian's Companion" (8vo., 1829), which has passed through several editions.

STANHOPE. I. James, earl, a British statesman and soldier, born in 1673, died in London, Feb. 5, 1721. He was the son of Alexander Stanhope, a brother of the 2d earl of Chesterfield and a diplomatist of some distinction under William III. Entering the military service at an early age, he was in 1694 commissioned a captain in the foot guards. After serving with credit in the wars in Flanders which terminated with the peace of Ryswick, he participated in the disastrous expeditions of 1702 and 1704 to the Spanish peninsula; and in 1705, being then a brigadier-general, he shared in the exploits of the earl of Peterborough's brilliant Spanish campaign. In 1707 he was made major-general, in 1708 commander-in-chief of the British forces in Spain, and in the latter year effected the reduction of Minorca and the capture of Port Mahon. After gaining further important successes in Spain, he was on Nov. 27, 1710, surprised by the duke of Vendôme at Brihuega, and forced with his army of 2,000 men to capitulate. Subsequent to his return to England he held no military command, but became a prominent whig member of parliament, to which he had been regularly returned since 1702. Having distinguished himself by his opposition to the commercial treaty with France and on other occasions, he was appointed by George I. on his accession one of his principal secretaries of state, Viscount Townshend being the other. The intrigues of the earl of Sunderland, by whom Stanhope, it has been asserted, was incited to betray his ministerial colleagues, led to the retirement of Townshend, Walpole, and others of the cabinet; and Stanhope was in April, 1717, made first lord of the treasury, and a few months afterward raised to the peerage as Baron Stanhope of Elvaston and Viscount Stanhope of Mahon. In the succeeding year he resumed his office of secretary, Sunderland becoming first lord of the treasury, and was created Earl Stanhope. On Feb. 4, 1721, while replying with much heat to an attack upon the ministry by the duke of Wharton, he burst a blood vessel, which caused his death on the succeeding day. II. Charles, 3d earl, grandson of the preceding, born in Aug. 1753, died in 1816. By his first wife, a daughter of the earl of Chatham, he had 3 daughters, the eldest of whom was the eccentric Lady Hester Stanhope. Succeeding to his family honors in 1786, he became noted for his radical democratic opinions on the prominent questions of the day, in discussing which he carried the principles of the whigs, with whom he voted, to a point deemed so perilous by that party that none dared follow him; and in the latter years of his life he used to be called "the minority of one." As a mechanical inventor he is well known by the printing press which bears his name, by his improvements in the construction of locks for canals, and by two ingenious calculating machines, one of which performed addition and subtraction, and the other multiplication and division. He also gave considerable attention to the subject ot electricity, and in 1779 published his theory of what is called the return stroke. His political works consist of a refutation of Price's "Plan for a Sinking Fund," a reply to Burke's "Reflections on the French Revolution," and an "Essay on Juries." III. Philip Henry, 5th earl, a British statesman and author, grandson of the preceding, born at Walmer, Kent, in 1805. He was graduated at Oxford in 1827, and in 1830, being then known by his courtesy title of Lord Mahon, entered parliament as member for Wotton Bassett, upon the disfranchisement of which borough he was returned for Hertford. Being unseated on petition, he was reëlected in 1835, and continued to represent Hertford until 1852. He has been conservative in politics, and held office during brief periods in the cabinets of the duke of Wellington and Sir Robert Peel. As a legislator he is favorably known by the copyright act of 1842, which he introduced and carried, and he occupies an important place among modern English writers of history and biography. His first work was the "Life of Belisarius" (8vo., 1829), succeeded by a "History of the War of Succession in Spain" (8vo., 1832), and the "History of England from the Peace of Utrecht to the Peace of Versailles, 1713–'83" (7 vols., 1836–'54). His remaining works comprise "Spain under Charles II." (8vo., 1840); "Life of Louis, Prince of Condé" (18mo., 1845); "Historical Essays contributed to the Quarterly Review" (8vo., 1849); a "Life of Joan of Arc" (1853); and a "Life of William Pitt" (4 vols. 8vo., 1861 *et seq.*). He has edited "The Letters of Philip Dormer Stanhope, Earl of Chesterfield" (1845; 2d edition, 5 vols. 8vo., 1853), and, in conjunction with Mr. Cardwell, 2 vols. of the "Memoirs by the Right Hon. Sir Robert Peel, Bart." (1856–'7), to be followed by a selection from his correspondence. During the publication of his history of England he entered into a controversy with Mr. Jared Sparks on the accuracy and value of the latter's edition of the "Writings of George Washington." He subsequently exonerated Mr. Sparks from the charges of serious "omissions and additions" originally preferred against him, but continued to "differ widely from him on the privileges and duties pertaining to an editor." Lord Stanhope succeeded to his title in 1855, since which time he has taken a less active part in public life. In 1834 he received the degree of D.C.L. from the university of Oxford, and since 1846 he has been president of the society of antiquaries. He was appointed by the duke of Wellington his literary executor.

STANHOPE, Lady Hester Lucy, an eccentric English woman, born in London, March 12, 1776, died at Joon, in the Lebanon, June 23, 1839. She was the eldest child of Charles, 3d Earl Stanhope, by Hester, daughter of the great earl of Chatham, and in girlhood was remarkable for precocity, and boldness and independence of character. Unlike her father, who was almost a democrat in principle, she prided herself upon her aristocratic birth, and the superior mental and physical qualities which she supposed to be its concomitants; and it was probably in consequence of this antagonism between parent and child that at an early age she entered the family of her uncle William Pitt, with whom she lived until his death, acting as his private secretary and sharing in all his confidences. Pitt having recommended his niece to the care of the nation, she received a pension of £1,200, which proving inadequate to support her according to her former rank and style, she retired to solitude in Wales. In 1810, disgusted with the artificial character of European society, and influenced also by the impression that a great destiny awaited her in the East, she resolved to expatriate herself. After spending several years in travel, during which she visited Jerusalem, Baalbec, Damascus, and Palmyra, at which last place she is said to have been crowned by 50,000 Arabs queen of the East, she established herself in 1813 at the deserted convent of Mar Elias, beside the little village of Joon, and within 8 miles of Sidon. Her striking manners and conversation, her munificence and reputation for extraordinary wealth, produced a strong impression upon the neighboring tribes and their chiefs, who learned to admire and ultimately to fear her. The old convent, perched upon an isolated eminence among the wildest scenery of the Lebanon, was soon converted into a fortress garrisoned by a band of Albanians, and became a refuge to all the persecuted and distressed who sought her assistance. Possessing a passion for intrigue and considerable diplomatic talent, she exercised a despotic sway over the surrounding country, fomenting and allaying commotions at her pleasure. So powerful was the influence which she wielded, that Ibrahim Pasha, when about to invade Syria in 1832, was constrained to solicit her neutrality. After the siege of Acre in the same year, she is said to have sheltered several hundred refugees. Whether for the purpose of awing her followers or from inward conviction, she practised astrology and other secret arts, and promulgated some peculiar religious sentiments which she held to the last. That her mind was diseased on certain points is clear from the fact that she kept in a magnificent stable two mares, on which she fancied she was to ride into Jerusalem with the Messiah at his next coming, to inaugurate the millennium. She treated with extreme rudeness many of the travellers who visited her, particularly Englishmen, and had an especial enmity against consuls and commercial agents, who, she said, "were intended to regulate merchants, and not to interfere with or control nobility." The extravagant state which she maintained and her numerous benefactions gradually brought pecuniary embarrassments, and during the latter years of her life she was constantly harassed by debts. Nothing, however, could tempt her to return to England, and she was forced to resort to various dishonorable shifts to elude her creditors, dying at last with no European near her, and surrounded by a crowd of native servants, who plundered the house almost before life had left her body. She was buried in the garden adjoining her residence by the British consul at Beyrout and Dr. W. M. Thomson, an American missionary, the latter of whom, for several years her neighbor, thus sums up her qualities: "On most subjects she was not merely sane, but sensible, well informed, and extremely shrewd. She possessed extraordinary powers of conversation, and was perfectly fascinating to all with whom she chose to make herself agreeable. She was however whimsical, imperious, tyrannical, and at times revengeful in a high degree. Bold as a lion, she wore the dress of an emeer, weapons, pipe, and all; nor did she fail to rule her Albanian guards and her servants with absolute authority. She kept spies in the principal cities, and at the residences of pashas and emeers, and knew every thing that was going forward in the country." Her "Memoirs as related by Herself" (3 vols. 8vo.), and "Travels" (3 vols. 8vo.) by Dr. Meryon, who had been for several years her physician, were published soon after her death.

STANHOPE, Philip Dormer. See Chesterfield.

STANISLAS I. LESZCZYNSKI, king of Poland, and afterward duke of Lorraine and Bar, born in Lemberg, Galicia, April 20, 1677, died in Lunéville, Feb. 23, 1766. He was the son of Raphael Leszczynski, palatine of Posen and treasurer of Poland, and was appointed archbutler of the crown by Augustus II. When war broke out between Charles XII. of Sweden and that prince, he was in 1704 sent on a mission to the former by the diet at Warsaw, won the good graces of the conqueror, and through his influence was in the same year elected to the throne of Poland. This he held but a few years; his patron having been defeated at Pultowa in 1709, he was unable to resist his competitor Augustus II., left Poland in 1712, and took refuge in Pomerania, and then in Sweden. For the sake of peace he was willing to abdicate, and having gone for this purpose to Charles XII., then at Bender, was taken prisoner by the hospodar of Moldavia and delivered to the Turks; being released in 1714, he returned to Sweden, was appointed governor of Deux-Ponts by Charles XII., and remained there until that prince's death in 1719. Without protection and bereft of his patrimonial estates, he sought an asylum in France, and the regent Philip of Orleans granted him a pension and permission to reside at Wissembourg, Alsace, where he lived obscurely with his only daughter Marie Leszczynska. He had given up all ambitious aspirations, when he was suddenly apprised that the hand of his daughter was desired for Louis XV., to whom she was married Sept. 5, 1725. In 1733, on the death of Augustus II., he was recalled to

Poland by his adherents, who hoped that he would be supported by the French government; he however received only lukewarm assistance, while Russia strongly favored his competitor Augustus III.; he was obliged to retire to Dantzic, where he was besieged by a Russian army, and after a bold resistance of several months had a remarkable escape. In accordance with the preliminaries of the peace of Vienna in 1738, he resigned his pretensions to the throne of Poland, but was allowed to preserve his royal title; his confiscated estates were restored to him, and he received beside from Austria the duchies of Lorraine and Bar, which on his death were to be united to France. He died after 3 weeks' suffering, caused by his garments taking fire as he was reading. He has been deservedly styled *Le Bienfaisant.* He left several essays on philosophy, politics, and morals, which have been printed under the title of *Œuvres du philosophe bienfaisant* (4 vols. 8vo. and 4 vols. 12mo., 1765), a selection from which (*Œuvres choisies de Stanislas, roi de Pologne, duc de Lorraine et de Bar*) was published in 1825.

STANISLAS AUGUSTUS, king of Poland. See POLAND, vol. xiii. pp. 432–'3.

STANISLAUS, a central co. of California, bounded N. in part by the Stanislaus, and drained by the San Joaquin and Tuolumne rivers; area, nearly 900 sq. m.; pop. in 1860, 2,245. The surface is generally hilly, and the soil well adapted for farming and grazing. The chief productions in 1858 were 18,500 bushels of wheat, 48,000 of barley, and 75,000 lbs. of wool. Gold and other minerals are found. Capital, La Grange.

STANLEY, a S. W. co. of North Carolina, bounded E. by the Yadkin and S. by Rocky river; area, 280 sq. m.; pop. in 1860, 7,801, of whom 1,169 were slaves. The surface is mountainous and the soil generally fertile. The productions in 1850 were 31,267 bushels of wheat, 203,281 of Indian corn, and 22,877 of oats. There were 2 tanneries, 6 grist mills, 21 churches, and 600 pupils attending public schools. Gold and silver in considerable quantities have been found. Capital, Albemarle.

STANLEY, EDWARD, an English divine and author, born in London, Jan. 1, 1779, died at Brahan castle, Ross-shire, Sept. 6, 1849. He was educated at St. John's college, Cambridge, and in 1805 presented to the living of Alderley, which he retained for the next 32 years. He gave much attention to the natural history of his neighborhood, and became a contributor on such topics to "Blackwood's Magazine" and other periodicals. His "Familiar History of Birds, their Nature, Habits, and Instincts" (2 vols., 1835), was published under the auspices of the society for promoting Christian knowledge. In 1837 he was offered by Lord Melbourne the bishopric of Norwich, which he accepted with some reluctance. His views were of so liberal a character, that he was accused of latitudinarianism. His "Addresses and Charges" were published in 1851, with a memoir by his son Arthur Penrhyn Stanley. His remaining works comprise "Questions on the Bible," and a number of occasional sermons, pamphlets, &c. He was a fellow of the royal society, and president of the Linnæan society.—ARTHUR PENRHYN, an English clergyman and author, son of the preceding, born in Alderley, Dec. 13, 1815. He was educated at Rugby under Dr. Arnold, and in 1838 was graduated at University college, Oxford, where he subsequently resided for several years as tutor. In 1851 he was appointed one of the canons of Canterbury, which office he still holds, and he was also one of the chaplains of Prince Albert. In 1856 he was elected regius professor of ecclesiastical history at Oxford. In 1842 he preached the funeral sermon of Dr. Arnold in the chapel of Rugby school, whose "Life and Correspondence" he published in 1844. He has also published "Sermons and Essays on the Apostolic Age" (Oxford, 1847); a "Lecture on the Study of Modern History" (1854); "Historical Memorials of Canterbury" (1855); "Sinai and Palestine in Connection with their History" (2d ed., 1857); "History of the Eastern Church" (1861); and several occasional sermons and lectures. He is a leader of the so called "Broad Church" party in England.

STANLEY, EDWARD HENRY SMITH, styled by courtesy Lord Stanley, an English statesman, born at Knowsley Park, July 21, 1826. He is the eldest son of the present earl of Derby, and was educated at Rugby under Dr. Arnold, and at Trinity college, Cambridge. Having contested unsuccessfully the representation of Lancaster in parliament, he made an extended tour in North America, visiting Canada, the United States, and the West India islands, and during his absence was, in Dec. 1848, elected for the borough of Lynn-Regis. During a subsequent visit to India he was appointed under secretary of state for foreign affairs in the first administration of his father (Feb. 27 to Dec. 28, 1852); and at the general election of 1852 he was again returned for Lynn-Regis, which he has continued to represent down to the present time. In the spring of 1853 he submitted to the house of commons a motion which contemplated a more complete reform of Indian affairs than the measures proposed by the Aberdeen-Russell administration, and which was a foreshadowing of the policy adopted in 1858. Although a conservative in politics, Lord Stanley showed such liberal views on many questions, particularly the abolition of church rates, and recommended himself to public approval so strongly by his efforts for the intellectual improvement of the lower classes through the establishment of mechanics' institutes and libraries and the promotion of popular education, that on the death of Sir William Molesworth in 1855 he was offered by Lord Palmerston the seals of the colonial office, which he declined. He however accepted the office in the second Derby cabinet, formed in Feb. 1858, and in the succeeding May assumed the presidency of the board of control upon the resignation of the earl of Ellenborough, with the title of "her majesty's commissioner for the affairs of India." Upon the transfer of the government of India from the East India company to the imperial crown (Aug. 1858), he became the first secretary of the new department of India then created. Since the retirement of the Derby ministry in June, 1859, he has not held office.

STANLEY, Thomas, an English author, born in 1625, died in London, April 12, 1678. He was educated at Pembroke hall, Oxford, and subsequently resided for several years in the Middle Temple. In 1649 he published a volume of "Poems and Translations," followed in 1655-'60 by his "History of Philosophy, containing the Lives, Opinions, Actions, and Discourses of the Philosophers of every Sect" (3 vols. fol.), by far his most important production. A Latin translation of it by Olearius was published at Leipsic in 1711. In 1663 appeared his edition of Æschylus, including the fragments and the Greek scholia, together with a commentary and a Latin version. A reprint of this edition, with the commentary enlarged and corrected, was published at Cambridge in 1809 by Dr. Butler (4 vols. 4to.). In 1814-'15 appeared an edition of his poems with a biographical memoir by Sir Egerton Brydges.

STANZA (Ital.), a certain number of lines regularly adjusted to each other, and forming one of the divisions of a poem. The stanza should properly terminate with a full point or pause, whence its name, which signifies a station or resting place; but in practice this rule is not always observed, even in such varieties as the Spenserian stanza, where the metre would seem especially to require a full pause.

STAR. See Astronomy.

STAR CHAMBER, Court of the (*curia cameræ stellatæ*, so called from the gilded stars on the ceiling of the old council chamber of the palace of Westminster, in which it sat), a tribunal famous in the political history of England, and of which mention is made as early as the reign of Edward III. It appears to have been then, and for upward of a century and a half afterward, identical with the ancient *concilium regis*, or king's ordinary council, which alone exercised jurisdiction, the *concilium secretum*, or privy council, being a deliberative body; and at the accession of Henry VII. its powers had become so greatly abridged by restraining statutes as to render it almost inoperative as a court of justice. The statute of 3 Henry VII. (1488) placed the jurisdiction of the council, or rather of a part of the council, on a permanent basis by establishing a court composed of three high officers of state (to whom a fourth was subsequently added), a bishop and temporal lord of the council, and two justices of the courts of Westminster, which took cognizance of riots, perjury, the misbehavior of sheriffs, and other offences against the administration of justice, in examining which they invariably proceeded without the assistance of a jury. This tribunal, however, was distinct from the council itself, of which it may be considered a committee having delegated powers; nor did the act cited give the first legal authority to the criminal jurisdiction exercised by that body. It received an augmentation of its powers by act of 31 Henry VIII., "which," says Sir Thomas Smith, "was at that time marvellous necessary to do to repress the insolence of the noblemen and gentlemen of the north parts of England, who made their force their law;" and after an existence of nearly 60 years it was during the minority of Edward VI. merged in the general body of the council, which thenceforth, as in earlier times, constituted the real court of the star chamber. The latter continued under the Tudors and their successors, in spite of numerous restraining statutes, to exercise a jurisdiction, particularly in criminal matters, unauthorized by the act of Henry VII. erecting a new court, and which gradually rendered it one of the most odious instruments in overthrowing the liberties of the people. Every misdemeanor, and especially those of public importance for which the law, owing to the timidity and narrow-mindedness of its judicial interpreters, had provided no sufficient punishment, seems to have come within the scope of its inquiry. Among these were corruption, breach of trust, and malfeasance in public affairs, attempts to commit felony, or breach of proclamations; and to such an extent was its authority stretched under the Stuarts, that, according to Clarendon, "any disrespect to any acts of state, or to the persons of statesmen, was in no time more penal, and the foundations of right never more in danger to be destroyed." The mode of process was generally by information filed at the suit of the attorney-general, or, in certain cases, of a private relator, and in other respects resembled that familiar to the court of chancery. Although the court was held incompetent to pronounce sentence of death, fines, imprisonment, the pillory, whipping, branding, and various species of maiming were freely resorted to; and "the greater certainty of conviction," says Hallam, "and the greater severity of the punishment, rendered it incomparably more formidable than the ordinary benches of justice." According to the same authority, "the object of drawing so large a number of criminal cases into the star chamber seems to have been twofold: first, to inure men's minds to an authority more immediately connected with the crown than the ordinary courts of law, and less tied down to any rules of pleading or evidence; secondly, to eke out a scanty revenue by penalties and forfeitures." After flourishing with constantly increasing power for upward of a century, the court of the star chamber was finally abolished by act of parliament in 1641, although such was the reverence for precedent still remaining, that at first nothing more than a bill to regulate the tribunal was intended, and according to Clarendon the act finally passed was due to a suggestion from one not connected with the more ardent reformers.

STAR FISH, the popular name of the radiated animals of the class of echinoderms and the order *asteroidea*, well exemplified by the common species of the New England coasts, the 5-fingered Jack of the sailors. The quinary arrangement prevails to a remarkable extent in the star fishes; one of the problems proposed by Sir Thomas Browne was: "Why, among sea stars, nature chiefly delighteth in 5 points?" The body of the star fishes is depressed, and divided into rays like a star; the upper surface is studded with rough knobs, varying in color with the species, but generally reddish or yellowish, between which are the openings of many very minute tubes for the passage of water in and out of the body; the skin is coriaceous, and contains the above named corpuscles, beneath which is a cutaneous skeleton of porous calcareous pieces, movably articulated, and extending on the lower surface from the mouth in the centre to the end of the rays. In the lacunæ between these pieces are the ambulacral pores, along the centre of the lower surface of each ray, through which are protruded the ambulacral tubes; these are the principal organs of locomotion, are arranged in a double or quadruple row, and are provided with contractile sacs or vesicles on the inner surface of the envelope; the tubes are constantly in motion, each ending in a suctorial disk, and pull the animal along as by the successive action of so many little anchors. On the external edges of the rays are series of stiff spines, probably serving for protection, and at the end of each ray is a small reddish eye speck; there are also scattered over the upper surface small processes ending in calcareous hooks or pincers. The mouth opens into the stomachal cavity, from which branching cæcal tubes extend to the extremity of each arm; having no long tentacles like the sea anemone (*actinia*), the stomach can be everted over their food and then be turned back again; the mouth is very dilatable, and will admit large mollusks with the shell, the hard parts being ejected after the soft portions are digested. There is great variety in the spreading, division, and subdivision of the arms, and in the relative size of the central disk, but all are arranged after the radiated plan; the rays can be bent in any direction, according to the will or need of the animal, by the contractile skin and muscles. The slender ophiurans progress by the undulatory movements of the rays, which, when very slender, long, and branching, have no eyes at the tips; there is generally no anal aperture, and when present it is on the dorsal surface. By the action of cilia water flows through the body, through the aquiferous system, distending and protruding the ambulacral feet, filling the circular vessel around the mouth, and serving for respiration, which, according to Siebold, is performed partly by the vesicular appendages attached to the central ring; all the viscera are bathed in water, and respiration is also effected through the delicate blood vessels thereon distributed. The vascular system is very simple; the nervous ganglia are 5, arranged around the mouth, each sending filaments to the arm at whose base it lies; the sense of touch is very acute; the power of reproducing lost parts is very great, as every one knows from the mutilated and irregular specimens so commonly seen in the sea and in aquaria. On the upper surface, to one side of the centre and between two of the arms, is a round bright-colored spot, the madreporic plate or body, communicating with a canal leading to the water vessel around the mouth; this, according to Sharpey, is a sieve through which the water is filtered as it enters the aquiferous system for circulation through the whole body. They propagate by eggs only, and the sexes are in separate individuals; the larvæ are at first oval, ciliated bodies, without external organs or distinct parts; from these, which have a strictly bilateral symmetry, the radiated perfect animal is developed, at various stages of its growth, by a process of internal gemmation. The crinoid *comatula*, or feather star, free when adult, has its young attached on a long slender stem; Sars, a Norwegian naturalist, has traced the growth of *echinaster* from a spheroidal free-moving mass to the perfect star fish. Some species secrete a reddish fluid on the surface, probably the coloring matter, often irritating to the skin of persons handling them; according to Deslongchamps, they can inject a fluid into the shells of their victims, which stupefies and renders them an easy prey. Rymer Jones says star fishes may be considered as mere walking stomachs, their office in the economy of nature being to devour all kinds of garbage which would otherwise accumulate on the shores; they eat also living crustaceans, mollusks, and even small fish, and are believed to be very destructive to oysters; they are not used as food by man, but are in many places highly esteemed as manure. For a popular account of the British species the reader is referred to the "History of British Starfishes," by Edward Forbes (London, 1841), illustrated by excellent figures. In that work are described *comatula* (Lam.), the crinoid feather star; *ophiura* (Lam.), the sand star; *ophiocoma* (Ag.), the brittle star, so named from the facility with which the delicate arms are broken, but which are also readily repaired; *astrophyton* (Link), the Medusa's head, so called from the curling and interlacing of the very numerous ends of the rays; *uraster* (Ag.), the cross fish; *solaster* (Forbes), the sun star; *palmipes* (Link), the bird's foot star; *goniaster* (Ag.), the cushion star; and *asterias aurantiaca* (Linn.), the common star fish. The common star fish of the North American coast (*asterias rubens*, Linn.), generally considered the same as the European species, is too well known to need description;

the colors vary from reddish to yellowish, and the diameter from an inch to more than a foot; it is a very common inhabitant of public and private aquaria, and very interesting to study.

STAR OF BETHLEHEM (*ornithogalum umbellatum*, Linn.), a pretty liliaceous plant with white bulbs, numerous radical smooth green leaves striped with a white longitudinal line, and corymbose racemes of starry white flowers consisting of 6 sepals, greenish without and with white margins. The plant is a native of Europe, but, escaping from gardens, has become naturalized in fields and orchards in the United States by means of its tendency to multiply its bulbs, which, remarkably tenacious of life, have been conveyed from the compost heap and barn yard. The foliage is however very transient, perishing in early summer, so that its presence is not very detrimental to grass. There are many species of the *ornithogalum* which bear the same trivial name.

STARBOARD, the right hand side of a vessel to a person standing in the stern and looking toward the bow; opposed to larboard.

STARCH (also called amylaceous matter, and fecula), a proximate vegetable principle existing in almost all plants. It has also been detected in animal tissues, in the brain, and in some other organs when these are in a diseased condition; but being recently found always present in dust wherever collected, it is not improbable that the slight quantities observed in these matters may have been derived from this source. Its composition is represented by the formula $C_{12} H_{10} O_{10}$, and differs from that of grape sugar only by the latter containing the elements of 4 atoms of water in addition. By artificially producing this combination with water, starch is wholly converted into this sugar. In the animal system its elements readily enter into new combinations, and by its deoxidation it is supposed that the fats and fixed oils are produced that are found in both the animal and vegetable kingdoms. Its specific action is regarded as promoting animal heat and respiration. That it must play an important part in the animal as well as in the vegetable economy, is evident from the fact that it is the chief ingredient in most vegetable substances employed for food. In the farinaceous grains, as rice, barley, and maize, it exists in great purity. In wheat it is associated with gluten; in beans, peas, and other leguminous seeds, and also in oats, with saccharine matter; in potatoes, rye, and Windsor beans, with viscous mucilage; in the emulsive seeds, that afford oil by expression, as the nuts, linseed, and cocoa, with fixed oil and mucilage. In some roots, as those of different species of *arum* and of the *manihot utilissima* (see CASSAVA), it is accompanied by a poisonous juice, which however does not interfere with its easy separation and conversion into simple articles of food, as arrowroot, cassava bread, &c. From wheat flour, the raspings of potatoes, and similar substances, starch is readily obtained by kneading them with cold water on a cloth strainer. The fluid passes through milky from the particles of starch taken along with it, and being left to repose, these after a time subside. When pure they appear as a white glistening powder; and when magnified 300 to 400 times, distinct grains are seen of flattened ovate forms, varying in size and exhibiting peculiar marks according to the particular vegetables that furnished them. Such are the concentric rings or *rugæ* surrounding a minute circular hole or hilum at one or both ends of the granule. Thus it is that the adulteration of wheat flour by potato starch or flour may be detected. Several phenomena exhibited by starch have led chemists to the opinion that the microscopic granules are made up of a thin integument, which is insoluble in cold water and contains the same substance within, but in a soluble condition. When starch is ground in a mortar it is rendered partially soluble in cold water, and the same effect is produced by roasting it slightly. (See DEXTRINE.) But without this preparation starch may remain in water unchanged until the temperature is raised to a little more than 140° The granules then absorb water and swell, and the mixture suddenly assumes a viscous pasty condition, in which state it is applied by laundresses to stiffening linen. A cold solution of soda or potash containing two per cent. or more of alkali will also cause the granules to swell and form a tenacious paste; but if much water be then added, a small portion of the starch only remains in solution, the rest subsiding. The presence of starch is recognized by the blue color it acquires on the addition of free iodine to its solution, the intensity of the color increasing with the proportion of iodine employed, till with a large excess of this it is blackish blue. At a temperature of 200° the solution becomes colorless, and on cooling recovers its former shade. Boiling for some time destroys the color altogether, the starch first forming dextrine and then sugar. The presence of sulphuric acid hastens this change. Starch is insoluble in alcohol and ether. In its commercial form it is agglutinated in columnar masses, which are easily reduced to powder. It is without smell or taste, and when pressed in the fingers emits a peculiar sound and feels as if elastic. Its specific gravity is about 1.5. Its properties as an aliment differ somewhat with the sources that furnish it; thus, wheat starch is considered the most nutritious, probably from the presence of some gluten; arrowroot starch is the most digestible and the most free from gluten; starch from potatoes and rice is regarded as the poorest aliment, neither nutritious nor digestible.—There are but few historical notices of starch. Pliny speaks of it as being made in the island of Chios, and the best from summer wheat. Nothing more is known of its history until the time of Queen Elizabeth, when it was in use for stiffening the enormous ruffs of that period. It must have been rather an inferior article, as in the occasional allusions to it that have been preserved it is spoken of as of yellow or greenish color. In the last century the manufacture attained considerable importance in England; and starch was applied to numerous uses in the arts, in medicine, and for purposes of the toilet. It was employed with smalt and the stone blue or indigo color to stiffen and clear linen, as still practised by laundresses; in printing with colors it was used in strong gum water to make them work more freely and prevent their cracking; and the perfumers employed it in making their hair powders. In the reigns of Anne and George I., II., and III., the use of any other material as a substitute for starch in any of its applications was most strictly prohibited under severe penalties, and the manufacture was subject to extraordinary restrictions and taxes, most of which continued in force until 1833. About the close of the century its production was a subject of no little interest. In 1796 the society of arts awarded a prize medal to a Mrs. Gibbs of Portland for her discovery of the *arum maculatum* as a fruitful source of it, and the starch thus obtained was afterward sold as the Portland arrowroot. The same year Lord William Murray discovered a method of extracting it from horse chestnuts. The great development of the cotton manufacture created a new demand for starch, and the calico print works consumed it in enormous quantities. In 1859 a single establishment of this kind in Manchester used 6,000 cwt.—Starch is manufactured in different countries from those vegetable products that yield it most cheaply: in England from wheat, barley, and rice; on the continent from potatoes and leguminous seeds; and in France from the horse chestnut also, which has been collected of late years for the factory at Nanterre at prices equal to those for which potatoes are sometimes sold there. In the United States Indian corn and potatoes are most commonly used for starch. The application of the former to this use was patented by James Colman in 1841, and was successfully practised by Thomas Kingsford of Oswego, N. Y., in 1842. In 1849 he had a large factory at that place, which is still in successful operation under the direction of Messrs. T. Kingsford and son, having up to the end of the year 1860 made nearly 30,000 tons of starch. Its annual production for 5 years was as follows: 1856, 6,328,458 lbs.; 1857, 8,018,778 lbs.; 1858, 8,686,516 lbs.; 1859, 6,747,586 lbs.; 1860, 8,500,000 lbs.; far exceeding that of any other starch factory in the world for the same time. The total consumption of raw material in the 12 years from Jan. 1, 1849, was 2,476,000 bushels of Indian corn and 164,448 bushels of wheat, beside some damaged flour. The boxes for packing the starch have required 15,000,000 feet of basswood, supplied chiefly by the farmers in the neighborhood. The building has a front of 510 feet, and extends back over the Oswego river 250 feet. Its flooring covers 250,600 feet, or nearly 6 acres. For grinding the corn there are 15 pairs of buhrstones, and 6 pairs of large, heavy iron rollers. The river furnishes the power to drive the machinery, and a steam engine of 150 horse power is provided to make up any deficiency in very dry seasons. The vats employed in purifying the starch have a capacity of 2,200,000 gallons, and the length of gutters for conveying and distributing the starch waters is over 3 miles. A similar factory, almost or quite equal to this in capacity, commenced operations at Glen Cove, on Long island, in 1858. This also uses Indian corn, which is more cheaply transported from the western states than the starch from it would be. The product for each bushel is about 28 lbs., and the boxes of the starch, on account of their bulk and the extra care they require, make more expensive freight than the raw material. Potato starch factories are more numerous, but not so extensive. In the town of Stowe, Vt., there are 5 of them, each one of which consumes from 16,000 to 20,000 bushels of potatoes yearly, and produces about 8 lbs. of starch to the bushel.—The production in starch of the several materials employed in the manufacture is variously given by different authorities, probably by reason of the influence on the same plant of difference of soil and climate, and its condition as regards maturity, and possibly also of the more or less complete separation of the starch from other accompanying substances; and some perhaps give results of the factories, and others of the laboratories; and some of the grains, and others of their flour. Thus in wheat the proportion of starch is rated from 35 to 77 per cent., or as an average at 60; rice contains from 75 to 87 per cent.; Indian corn, 64.5 to 80; barley, 60 to 68; rye, 60 to 65.5; oats, 37 to 65; buckwheat, 44 to 52; peas and beans, 37 to 66; horse chestnut, 25; potatoes and arrowroot, 20. Wheat is treated by two processes. The old method is to expose the flour mixed with water and the spent waters of previous operations to fermentation for several weeks. The gluten undergoes putrefaction, emitting a most noisome odor. The sugar and a portion of the starch are converted into alcohol, and a part of this into lactic and acetic acids, which dissolve the gluten that has escaped putrefaction. Thorough washing and draining remove the soluble matters, and the starch left behind is next dried in blocks about 6 inches square; as the water escapes from them, the masses break up into the columnar fragments peculiar to starch. The other method, introduced by M. Émile Martin of Vervins, France, consists in kneading the flour into dough with water, and then washing on a sieve of No. 120 wire in a stream of water as long as the water passes through milky. The starch in suspension and the sugary portion in solution are caught below the sieve, and the gluten nearly all remains behind in a sticky mass. What passes through is left to ferment 24 hours in an oven at 68° F., and a little leaven is added, or the skimmings of a former operation, to hasten the process. The portion of gluten carried through with the starch is thus separated and removed by skimming. The starch is then treated like that otherwise obtained. The product by this method is about 50 per cent. of the weight of the flour, while by the other process it is only from 35 to 40 per cent. Nearly the whole of the gluten also is saved in a condition suitable for food, either by mixing it with flour and making of it macaroni and similar pastes, or, as recommended by M. Robine, with boiled potatoes, and thus making a cheap and nutritious bread, by adding to the potatoes a nutritive element in which they are deficient. Potato starch is made from rasped or grated potatoes, by a process similar to that just described. This variety does not assume the columnar form in drying, and is also peculiar in retaining a large amount of moisture, generally 20 per cent., or when saturated 23 per cent. It is largely consumed for a variety of farinaceous preparations sold by the druggists as delicate food for invalids, under numerous high-sounding names. (See ADULTERATION.)—The corn used for starch is the white flint kind. Received at the factory, it is hoisted to the top of the building, winnowed to remove foreign substances, and then transferred to vats, where it is long soaked before grinding. It is run through troughs with water to the mills, and when ground the mixed meal and water is conveyed in a similar manner to the tubs in which the separation of the starch is effected. The gluten fluid that flows from these has a musty and disagreeable odor and appearance in the troughs, and the substance lacks when concentrated the consistency of wheat gluten, not "rising" like it in fermentation by the expansive action of the carbonic acid gas generated in this process. Its only value is for feeding horses, cattle, and swine. The starch fluid is conveyed through troughs to great vats in the basement of the building, where the water is partially removed, and then it flows into smaller wooden vessels from which a portion of the surplus water drains away through a cloth laid in the bottom of each. The mass of starch, then tolerably solid, is placed upon shelves made of loose bricks, when more moisture escapes by absorption and evaporation. Kiln drying finishes the process, and the starch is obtained in prismatic forms ready to be put up in papers or boxes for the market.—Rice is treated by a process patented in 1840 by Mr. Orlando Jones, which is also quite as applicable to the other grains, and by the use of which the offensive odors from the putrefactive fermentation are avoided. The rice is macerated in a weak alkaline solution, a gallon of water to every 2 lbs. of rice, and about 200 grains of caustic soda or potash to the gallon. Of this strength the solution takes up the gluten, leaving the starch. After standing about 24 hours, the alkaline liquid is drawn off, and the rice after being well washed is drained, and is then ground into flour. A fresh quantity of lye is added to it, and it is again digested for 24 hours, with frequent stirring. It is now left for 70 hours, in which time the dissolved gluten rises and is all found in a turbid, yellowish stratum at the top. This portion is carefully drawn off, leaving the fibrous portion of the grain at the bottom intermixed and covered with starch. The deposit is then stirred up and washed with abundance of cold water, and the mixture being left to repose, the fibrous portion is deposited with very little starch, and the remainder is drawn off by a siphon through a fine sieve into a cistern. Further washings of the deposit are added to this, and the water is finally removed, and the starch is dried in the usual way. The gluten is recovered by neutralizing its solution with the exact quantity of sulphuric acid required for this, when it is set free and falls in flakes to the bottom. These are collected, washed, and ground into flour, when the substance is prepared for culinary purposes. This process applied to wheat results in the saving of all the gluten for food.—The principal use of starch has already been noticed. It has at present a very limited application in medicine; it is used externally as an absorbent of irritating secretions; it may also be given as an antidote to iodine taken in poisonous quantities. Those varieties described under ARROWROOT, CASSAVA, and SAGO, form a mild nutritious diet for the sick. Starch is sometimes adulterated with carbonate and sulphate of lime, and is purposely charged with water, sometimes to the extent of 12 per cent.—The importations of starch into the United States in 1860 amounted only to $1,400, the largest quantities coming from Scotland, China, and England.—The subject of starch is treated by Dumas in *Chimie appliquée*, vol. vi., and by Parnell in "Applied Chemistry;" and the manufacture from the potato is described by M. Payen in *Précis de chimie industrielle* (Paris, 1851).

STARGAZER, a spiny-rayed percoid fish of the family *trachinidæ* or weevers, and genus *uranoscopus* (Linn.), so called from the position of the eyes, which look directly upward. The body is elongated, covered with smooth cycloid scales; head depressed, large and wide, bony and rough, with the gape ascending or vertically cleft, the upper jaw the shorter, and the teeth small and crowded on the jaws, palate, and vomer; branchiostegal rays 6; dorsals 2, of which the 1st is small and spinous, the 2d and the anal long; ventrals in front of the large pectorals and on the throat; anus very far forward; air bladder absent. In some of the family the dorsal and opercular spines are capable of inflicting painful wounds; they have the power of raising the eyeballs from and retracting them within their sockets. There are more than a dozen species of the genus, mostly East Indian, of which the best known is the *U. scaber* (Linn.) of the Mediterranean, about a foot long, of a grayish brown color above, with irregular series of whitish spots and grayish white below; ugly as it is, some people eat it. This was well known to the ancients, and Aristotle correctly describes the gall bladder as larger than in most other fishes; it is also called *callionymus* by the old authors, and is proverbially referred to by dramatic writers as the emblem of an angry man; the bile was formerly supposed to possess great medicinal virtues in defective vision and hearing, and in arresting fungous growths. On the coast of South Carolina has been found the *U. anoplos* (Cuv.), about 2 inches long, greenish above with minute black dots, and silvery below; the cheeks are unarmed. These fishes live on the bottom in deep water, burying all but the head in the sand or mud, and there lying in wait for prey; they are voracious, and like other ground fish some have sensitive barbels about the mouth; though the gills are widely open, they live a long time out of water; some have a slender fleshy filament in front of the tongue, which can be protruded, probably to attract fishes within reach of their jaws, like the cutaneous appendages on the head of the goose fish (*lophius*).

STARK. I. A N. E. co. of Ohio, drained by the Tuscarawas river and its branches; area, 570 sq. m.; pop. in 1860, 42,976. The surface is undulating, and the soil a rich, sandy loam. Coal and limestone are abundant. Swine are largely exported, and it produces more wheat and butter than any other county in the state. The productions in 1850 were 590,594 bushels of wheat, 578,171 of Indian corn, 414,434 of oats, 41,746 tons of hay, 275,664 lbs. of wool, and 1,211,021 lbs. of butter. There were 5 newspaper offices, 98 churches, and 13,290 pupils attending public schools. It is intersected by the Pittsburg, Fort Wayne, and Chicago, and the Cleveland and Pittsburg railroads, and the Ohio canal. Capital, Canton. II. A N. W. co. of Ind., drained by the Yellow and Kankakee rivers; area, 432 sq. m.; pop. in 1850, 557; in 1860, 2,195. The surface is level and in many places marshy, with several small lakes, and the soil is fertile. The productions in 1850 were 3,153 bushels of wheat, 11,170 of Indian corn, and 698 tons of hay. Capital, Knox. III. A N. W. co. of Ill., intersected by the Spoon river; area, 290 sq. m.; pop. in 1860, 9,004. The surface is partly prairie and the soil fertile. The productions in 1850 were 54,327 bushels of wheat, 312,475 of Indian corn, 50,703 of oats, and 5,630 tons of hay. Capital, Toulon.

STARK, JOHN, an officer in the American revolution, born at Londonderry, N. H., Aug. 28, 1728, died at Manchester, N. H., May 8, 1822. In 1752 he went with 3 friends on a hunting expedition to Baker's river in the N. part of the state remote from the settlements, and while separated from his companions was captured by the St. Francis Indians, and remained with them several months until ransomed by the Massachusetts commissioners. During his stay with the Indians he became very popular among them by his frequent exhibitions of courage and independence, and was adopted into the tribe. In 1754 he joined the rangers under Major Rogers in the war against the French and Indians, in 1756 was made a lieutenant, and in 1757 a captain, distinguishing himself by his bravery and coolness in several severe engagements. He rendered efficient services in bringing off the troops after the ill-fated expedition to Ticonderoga under Lord Howe in 1758, and was actively employed in the subsequent campaign of Gen. Amherst; and in 1760, the war being virtually closed, he retired from the service, and was not again conspicuous until the outbreak of the revolution. In 1775, on receipt of the intelligence of the beginning of hostilities, he hastened to Boston after directing the volunteers in his neighborhood to rendezvous at Medford. Of those who followed him two regiments were formed, of one of which he was elected colonel, and at its head he thrice repulsed the veteran forces of the British army at Bunker hill. He afterward remained with his regiment at Winter hill until the British evacuated Boston in March, 1776. He was in the expedition against Canada, and remonstrated against Gen. Schuyler's retreat to Ticonderoga. In December he marched with his regiment under Gen. Gates to reënforce Gen. Washington. He led the van in the attack upon Trenton, and was in the battle at Princeton. In 1777, the time of his regiment having expired, he returned to New Hampshire and raised a new one; but being as he thought unjustly neglected by congress in the list of promotions, he retired from its service. He however received a vote of thanks from the New Hampshire legislature, and in a short time was placed in the independent command of the troops raised by New Hampshire to oppose the British advance from Canada. Acting upon the authority of the state and his own judgment, he firmly refused to obey the orders of Gen. Lincoln to march to the west of the Hudson, leaving Burgoyne's rear unmolested; and on Aug. 16, 1777, he fought the battle of Bennington, killing over 200 of the enemy and taking 600 prisoners and 1,000 stand of arms. For this brilliant action congress passed a vote of thanks to him and created him a brigadier-general, notwithstanding they had just previously passed a vote of censure for his disobedience of the orders of Gen. Lincoln. He joined Gen. Gates at Bemus's heights, but the term of his militia having expired, he was obliged to return to New Hampshire and recruit a new force, with which he cut off Burgoyne's retreat from Saratoga, and thus compelled him to surrender. In 1778 he was placed in command of the northern department; in 1779 and 1780 he served in Rhode Island and New Jersey, and at West Point, where he was a member of the court martial which condemned André; and in 1781 he again had command of the northern department, with his head-quarters at Saratoga. At the close of the war he retired to private life, and was not again connected with public affairs. With the exception of Sumter, he was the last surviving general of the revolution at the time of his death.—See "Life of John Stark," by Edward Everett, in Sparks's "American Biography," 2d series, vol. i.

STARLING, or STARE, the common name of the conirostral birds of the family *sturnidæ*, and sub-family *sturninæ*, of which the genus *sturnus* (Linn.) is the type; the family also includes the straight-billed birds like the grakles, oxpecker, red-winged blackbird, and satin bower bird, described in separate articles. In *sturnus* the bill is long, straight, and sharp, with flattened culmen and tip; wings long and pointed, with 1st quill spurious and 2d and 3d nearly equal; tail short and nearly even; tarsi strong and broadly scaled; toes long, including the hind one, the outer united at the base; claws long, curved, and sharp. In habits the starlings resemble the smaller species of the crow family, and the food consists of worms, snails, insects, seeds, and fruits; they are docile in captivity, and may be taught to repeat a few words and to whistle short tunes. They are confined to the old world, migrating in large flocks, preferring swampy places; the flight is rapid and even, accompanied toward evening by singular circular evolutions; the note is a shrill whistle, with an occasional chatter or imitation of the cry of other birds and of animals; the nest is made of dried grass, in holes of trees or old buildings, and the eggs are 4 to 6. The best known species is the common starling (*S. vulgaris*, Linn.), about 8 inches long, of a black color, with purple and greenish reflections, and spotted with buff; the female is much less brilliant, and the young males are brownish gray. This well known, handsome, and sprightly bird is found from N. Europe to S. Africa, and in E. Asia, occurring in as large flocks as the allied grakles (*quiscalus*) in North America; in England it often migrates south in October, returning in March; it is frequently kept in cages; the flesh is disagreeable; the eggs are pale blue. —The American starling (*sturnella Ludoviciana*, Swains.) has been described under MEADOW LARK. In the genus *pastor* (Temm.) the bill is shorter and more curved; it contains about a dozen species in the old world, with the habits of the preceding genus, also the one of seeking insects on the backs of cattle. The rosy starling (*P. roseus*, Temm.) is about 8 inches long, with the head, neck, quills, and tail black with violet gloss, and the rest of the plumage delicate rose-colored; the head is crested, and the bill and legs yellowish. It is found in S. E. Europe, and in the warm parts of Asia and Africa; in some places it is held in great veneration for the enormous quantity of noxious insects, especially locusts, which its flocks devour.

STARR, a S. co. of Texas, bounded S. W. by the Rio Grande, which separates it from the Mexican state of Tamaulipas; area, 4,420 sq. m.; pop. in 1860, 2,406, of whom 6 were slaves. It is well adapted to grazing and to the cultivation of cotton, corn, and sugar cane. Large droves of wild horses are found on the prairies. Capital, Rio Grande City.

STARVATION. See ABSTINENCE.

STASSART, GOSWIN JOSEPH AUGUSTIN, baron, a Belgian statesman and author, born in Mechlin, Sept. 2, 1780, died in Brussels, Oct. 16, 1854. He completed his education in Paris, and was appointed successively intendant in the Tyrol (1805), successor of Bignon in Berlin (1808), and prefect of the department of the Bouches de la Meuse (1811). He took part as an officer of artillery in the defence of Paris (1814), offered his services to the emperor of Austria after the first restoration, attached himself again to Napoleon as envoy to Austria and master of requests during the Hundred Days, and on the second restoration retired to Namur and devoted himself to literary studies. He represented Namur in the second chamber at the Hague from 1821 to 1830, and supported the opposition. After the Belgian revolution of 1830, he was appointed governor of the provinces of Namur and Brabant, was president of the senate from 1831 to 1838, was sent as envoy extraordinary to the court of Turin in 1840, and lived in retirement from 1841. His writings, including *Idylles* (1800), *Pensées de Circé* (1814), *Fables* (1818), and treatises on agriculture and archæology, were collected by Dupont-Delporte (Paris, 1855).

STATEN ISLAND. See RICHMOND CO., N. Y.

STATICS. See MECHANICS.

STATISTICS, the science which has for its office the collection and arrangement of facts relative to the physical, social, political, financial, intellectual, and moral condition and resources of a state or nation. Some departments of statistical knowledge are of very ancient origin. No nation has made any considerable advance toward civilization, which has not at stated periods taken a census more or less complete of its inhabitants. That such statistical records were kept by the Jews, the Greeks, and the Romans, there is abundant evidence. In later times, the first writer on statistics was the Venetian doge Tommaso Mocenigo, who in 1421 collected the materials for a memoir on the situation of different empires, their monetary systems, finances, public debts, &c. In 1467 Francisco Sansovino published a statistical work entitled *Del governo e amministrazione di diversi regni e republiche* (4to., Venice, 1467), which was translated into several languages and often reprinted. During the next century Ventura, Paruta, and Giovanni Botero, all Italians, wrote on the subject. Botero's *Relazioni universali* (Rome, 1592) was translated into most of the languages of Europe. Pierre Davity, a French writer, published in 1621–'2 a valuable work on the geography, government, finances, religion, and customs of the principal countries of the world.

Hans de Laet in 1624 commenced the publication in Holland by the Elzevirs of his "Respublica," a series of statistical works, and was followed during the 17th century by Conring, Bose, Beckmann, and Gastel in Germany, by De Luca and Everard Otto in Holland, and by Oldenburg in Switzerland, whose *Thesaurus Rerumpublicarum* (4 vols. 8vo., Geneva, 1675) was an excellent compilation of statistical matters. In 1749 Gottfried Achenwall delivered lectures on statistics in the university of Göttingen, and gave the name (Ger. *Staat*, state) to the science. Conring, it is stated, had lectured on the subject nearly a century before; but Achenwall systematized it, and prepared a treatise for the use of the students of the university (*Staatsverfassung der Europäischen Reiche im Grundrisse*), which passed through 7 editions in the next 50 years. Walch and Reinhard also published text books on the subject, soon after, for their respective universities. A student of Achenwall, Professor Schlözer, developed the science more fully than his teacher, but died before his great work, "Theory of Statistics" (Göttingen, 1804), was completed. In England, the first statistical work of note was by Smollett, who published "The Present State of all Nations" (8 vols. 8vo., London, 1768). Gatterer (Göttingen, 1773), Niemann (Altona, 1807), and Leopold Krug (Berlin, 1807) have written able works on the science. Luden (Göttingen, 1812 and 1817) has been one of its most vehement assailants. Among the statistical writers of the present century, those who occupy the first rank are Melchior Gioja, the author of *Nuovo prospetto delle scienze economiche* (6 vols. 4to., Milan, 1815–'19) and *Filosofia della statistica* (2 vols. 4to.); Hassel, *Lehrbuch der Statistik der Europäischen Staaten* (4 vols., Weimar, 1812–'18), and several other geographical and statistical works; Stein, *Manuel de géographie et de statistique* (3 vols. 8vo., Leipsic, 1838); Schubert, professor at Königsberg, *Staatenkunde von Europa* (6 vols., Königsberg, 1835–'45); Meusel, *Literatur der Statistik* (2 vols., Leipsic, 1806–'7); Malchus, *Statistik der Staatskunde* (Stuttgart, 1826); Schnabel, a Bohemian writer, *Statistique générale des états Européens* (2 vols. 8vo., Prague, 1829); Herbin and Peuchet, *Statistique de la France* (7 vols., Paris, 1803); Adriano Balbi, various comparative statistical works on Portugal, France, Russia, the British empire, &c. (Paris, 1822–'9); Berghaus, author of *Allgemeine Länder- und Völkerkunde*, of *Staatenkunde*, and numerous other works, and editor of *Annalen der Erd-, Völker- und Staatenkunde* (1830–'43), *Geographisches Jahrbuch*, and other periodicals; Becker, author of numerous works on Austrian statistics; Dieterici, chiefly on the statistics of Prussia and the Zollverein; Charles Dupin, *Forces productives et commerciales de la France* (2 vols. 4to., Paris, 1832), and other works; J. H. Schnitzler, *Essai d'une statistique générale de l'empire de Russie* (Strasbourg and St. Petersburg, 1829), and *Statistique générale, méthodique et complète de la France* (4 vols. 8vo., Paris, 1842–'6); Maurice Block, *Statistique de la France* (2 vols. 8vo., Paris, 1860); J. R. McCulloch, the author of many statistical works in English of great value; John McGregor, "Commercial Statistics" (5 vols. 8vo., London, 1843–'50), and other works; the Rev. John Clay, author of several works on prison statistics; Léon Faucher, author of numerous statistical contributions to the *Journal des économistes;* W. Newmarch, editor of the "Journal of the Statistical Society;" and in the United States, T. Pitkin, A. Seybert, J. S. Fisher, J. D. B. De Bow, Freeman Hunt, Dr. J. Thomas, Dr. J. Chickering, T. P. Kettell, J. S. Homans, J. C. G. Kennedy, Dr. J. G. Cogswell, and Dr. Edward Jarvis.—Within a few years past, societies for the collection of statistics have been established in most of the countries of Christendom. The statistical society of London was founded in 1834, and has since 1837 published a quarterly journal. The Parisian society commenced in 1842 the publication of a monthly periodical, the *Journal des économistes*, which has a deservedly high reputation. In the United States there is a genealogical and statistical society at Boston, which published for some years a quarterly "Register;" a geographical and statistical society at New York, which issues a quarterly "Bulletin;" and several periodicals devoted in part to special statistics, such as the "American Journal of Science and Arts," the "American Journal of Education," the "Merchants' Magazine," the "Bankers' Magazine," "De Bow's Commercial Review," the "Mining Magazine," and the "United States Insurance Gazette and Magazine." The British association for the advancement of science has had a statistical section since 1833; the American association has a similar section; and the encouragement of the collectors of statistical matters is one of the avowed means by which the Smithsonian institution proposes to diffuse knowledge among men.

STATIUS, CÆCILIUS. See CÆCILIUS STATIUS.

STATIUS, PUBLIUS PAPINIUS, a Roman poet of the time of Domitian, whose birth has been placed in A. D. 61, and death in A. D. 96, though there is only uncertain evidence for either statement. His father was a preceptor of Domitian, by whom the son was patronized. In the Alban contests he 3 times gained the victory. Juvenal is the only ancient author who mentions him (Satire vii. 82). It has been stated, but without good evidence, that he was a Christian, and that the emperor stabbed him with a *stilus* in a moment of anger. His extant works are: *Silvarum Libri V.*, a collection of 32 poems on passing events, divided into 5 books; *Thebaidos Libri XII.*, an epic poem, founded upon the legendary account of the expedition of the Seven against Thebes, of which the 1st book was translated into English by Pope; and *Achilleidos Libri II.*, an epic poem never finished. There are no good editions of Statius, the best being that found in Lemaire's series of Latin classics (4 vols. 8vo., Paris, 1825–'30). Five books of the "Thebaid" have been translated into English by Thomas Stephens (8vo., London, 1648), and the entire poem by W. L. Lewis (2 vols. 8vo., Oxford, 1767 and 1773). The "Achilleid" has been translated by Howard (8vo., London, 1660).

STATUARY. See SCULPTURE.

STATUTE OF FRAUDS. See FRAUDS, STATUTE OF.

STATUTES OF LIMITATION. See LIMITATION, STATUTES OF.

STAUDENMAIER, FRANZ ANTON, a German theologian and philosopher, born at Danzdorf, Würtemberg, Sept. 11, 1800, died in Freiburg, Baden, Jan. 19, 1856. He studied at the university of Tübingen, and was ordained a Roman Catholic priest in 1827. In 1828 he was appointed tutor in the theological seminary at Tübingen, in 1830 ordinary professor of theology in the newly created theological faculty of the university of Giessen, in 1837 ordinary professor in the university of Freiburg, and in 1843 also a canon of the cathedral church of that city. In 1851 he was elected a member of the first chamber of the legislature of Baden. His first work was a "History of the Election of Bishops" (*Geschichte der Bischofswahlen*, Tübingen, 1830), with particular reference to the rights claimed by Christian princes. His *Encyklopädie der theologischen Wissenschaften* (Mentz, 1834; 2d ed., 1840) is the only German work of the kind in Catholic literature. His work on the "Spirit of Christianity" (*Der Geist des Christenthums*, Mentz, 1835; 5th ed., 1855) has had a very extensive circulation, and has been translated into several foreign languages. The most important of his works is that on "Systematic Theology" (*Die christliche Dogmatik*, 4 vols., 1844–'52; not complete), in which he attempts to harmonize the results of modern philosophy with the doctrines of the Catholic church. His other principal works are: *Scotus Erigena und die Wissenschaft seiner Zeit* (vol. i., Frankfort, 1840; not completed); *Die Philosophie des Christenthums* (vol. i., Mentz, 1840; not completed); *Darstellung und Kritik des Hegel'schen Systems* (Mentz, 1844); and *Der Protestantismus in seinem Wesen und seiner Entwickelung* (Freiburg, 1846). Staudenmaier has also been a contributor to journals of Catholic theology, and to the Protestant "Journal for Philosophy and Speculative Theology," edited by Fichte.

STÄUDLIN, KARL FRIEDRICH, a German theologian, born in Stuttgart, July 25, 1761, died in Göttingen, July 5, 1826. He studied theology and philosophy at the university of Tübingen, from 1786 to 1790 made several literary journeys through Germany, Switzerland, France, and England, and was appointed in 1790 professor of theology at the university of Göttingen, where in 1803 he was also made consistorial councillor. In his earlier years he was a rationalist, but he gradually inclined to supernaturalism. His works are very numerous, and extend over nearly every department of theology; but those on church history are the most valued. Among them are: *Kirchliche Geographie und Statistik* (2 vols., Tübingen, 1804), the first scientific work on this subject; and *Geschichte der theologischen Wissenschaften* (2 vols., Göttingen, 1810–'11). He was also the editor of several theological journals.

STAUGHTON, WILLIAM, D.D., an American clergyman, born in Coventry, Warwickshire, England, Jan. 4, 1770, died in Washington, D. C., Dec. 12, 1829. At the age of 17 he published a small volume of "Juvenile Poems," and soon afterward entered the Bristol Baptist seminary to prepare for the ministry. He emigrated to South Carolina in 1793, and preached for nearly 17 months at Georgetown, S. C. In 1795 he removed to New York, and in 1797 took charge of an academy at Bordentown, N. J., and was ordained. Toward the close of 1798 he removed to Burlington, N. J., and in 1805 became pastor of the first Baptist church of Philadelphia, which increased so much under his ministry that its house of worship was several times enlarged, and three new churches were formed from it. With the last of these, the Sansom street church, Dr. Staughton identified himself, and continued there till 1823, preaching from 3 to 4 times every Sunday to audiences of several thousands, and 2 or 3 times during the week, and at the same time instructing 15 or 20 young men in theology, lecturing on botany, chemistry, and sacred and profane history in two female seminaries, editing wholly or in part two religious periodicals, and presiding or assisting at the meetings of numerous benevolent societies. In the autumn of 1823 he became president of Columbian college at Washington, D. C., which position he resigned in 1827, in consequence of the embarrassments of the college, which he had made extraordinary efforts to remove. He then returned to Philadelphia, and was soon afterward chosen president of the Baptist college and theological institution at Georgetown, Ky., but died on his way thither. He published little beside his numerous contributions to religious periodicals in prose and poetry, and 5 or 6 sermons and orations.

STAUNTON, a river in the S. part of Virginia, rising in Montgomery co., among the Alleghany mountains, flowing E. and S. E. through a pass in the Blue ridge, and with Dan river forming the Roanoke at Clarksville, Mecklenburg co. It is 200 m. long, and in the first 20 m. of its course has a fall of 1,000 feet.

STAUNTON, a town and the capital of Augusta co., Va., situated on a small tributary of the Shenandoah river, 120 m. W. N. W. from Richmond; pop. in 1850, 2,500; in 1860, 14,124. It is the oldest town in the valley of Virginia, having been incorporated in 1749, and is the seat of the western lunatic asylum and of the Virginia institution for the deaf and dumb and the blind. It has 2 weekly newspapers, 10 or 12 churches, several banks and banking houses, 2 academies, and 2 seminaries. It is surrounded by a populous and rich agricultural region, and has an important local trade. There are mills, founderies, and manufactories of various kinds. The Virginia central railroad passes through it, and it is the proposed terminus of the Manassas Gap railroad, partially completed.

STAUNTON, Sir George Leonard, an English diplomatist, born in Galway, Ireland, April 19, 1737, died in London, Jan. 14, 1801. He studied medicine and became a contributor to literary periodicals, and an intimate acquaintance of Dr. Johnson. He afterward held official position and practised medicine in the West Indies for several years. In 1774 he was attorney-general of Grenada, and when that island was taken by the French in 1779, he and Lord Macartney, the governor, were made prisoners, but were soon released and returned to England. In 1781 he went as confidential secretary of Lord Macartney to Madras. He made an advantageous treaty with Tippoo Sultan in 1784, for which he was raised to a baronetcy and received an annuity of £500 from the East India company. He was a member of Lord Macartney's embassy to China in 1792, of which he published an account (2 vols. 4to., 1797).—Sir George Thomas, an English author, son of the preceding, born in Salisbury, May 26, 1781, died in London, Aug. 10, 1859. He accompanied his father to China in 1792, entered the university of Cambridge on his return to England, and in 1799 went to Canton as secretary of the East India company's factory there, of which he afterward became president. In 1816 he was attached to Lord Amherst's embassy to China, and from 1818 to 1852, with a few intermissions, was a member of parliament. His principal works are: "The Penal Code of the Chinese Empire" (4to., London, 1810); "Narrative of the Chinese Embassy to the Tartar Khan Tourgouth during the Years 1812–'15" (1821); and "Miscellaneous Notices relative to China and the British Commercial Intercourse with that Country" (1822). A treatise on vaccination written by him in Chinese was the means of introducing its practice in some parts of the empire. He edited the "History of the Great and Mighty Kingdom of China," translated from the Spanish of Mendoza by Parke in 1588 (Hakluyt society, London, 1853).

STAUPITZ, Johann von, the friend and patron of Luther, born at Meissen, died in 1524. He entered in early life the Augustinian order, obtained from the pope in 1501 general privileges for the newly established university at Wittenberg, and in 1508 by his influence caused Luther, a member of his order, to be called to one of the professorships. Luther gratefully acknowledges that in his spiritual struggles he found in Staupitz a kind adviser and guide. Staupitz approved of the theses of Luther against the papal indulgences, though he did not publicly declare himself in favor of them. In 1518 he was with Luther at an assembly of his order at Heidelberg, and in the same year demanded at Augsburg that Luther should not be condemned unheard and untried. Soon after, however, fearing an adverse issue of the controversy, he withdrew to Saltzburg, where he became court preacher, and in 1522 abbot of a Benedictine convent. Whether, as some assert, he was shortly before his death bishop of Chiemsee, is doubtful. He is the author of two works, *De Amore Dei* and *De Fide Christiana*, in which a mystic tendency prevails.

STEALING. See Larceny.

STEAM, the name applied generically to the vapor or non-permanent gas given off by any liquid, in consequence of the volatility of such liquid and the influence of heat upon it; and more especially when the vaporization takes place at temperatures at or above the boiling point of the substance so affected. In the recent progress of mechanical art and science, however, this term has come to designate in a specific sense the vapor of water, as applied or applicable to the performance of work, or to other mechanical or economic purposes. In connection with this subject see Boiling Point, Evaporation, Heat, and Pneumatics. In popular language, the visible mist forming when a vapor is discharged into the air, as a little way from the spout of a boiling kettle, or in a dense cloud above an engine "blowing off" steam, is also called steam. This visible mist is, however, really of the nature of cloud; being probably a collection in immense numbers of minute vesicles formed of water condensed from the vapor, and also enclosing vapor or air, and which, disseminated in the atmosphere, constitute an opaque and visible mass, in the same way as do the fine globules of a transparent oil when the latter is beaten up and mingled through water. Steam, properly so called, is perfectly transparent and colorless, as are the greater number of gases of all sorts; and hence it is always wholly invisible. Whenever a confined body or other volume of steam seems to become visible, the truth is that a portion of the vapor is condensed into water in fine drops, or in a haze or cloud; and though there may also be steam occupying the space through which this is diffused, it is the water or cloud only that is seen. The engineer and the general reader have thus alike to bear in mind that, in dealing with steam (proper), they have to do with a gaseous body which eludes the sight as completely as the purest atmospheric air. Perfect steam is, moreover, in no way moist, but is dry, as are the permanent gases; the moisture sometimes showing upon a solid surface it touches, or that has been plunged into it, being due to condensation. With such slight exceptions as are hereafter to be noted, steam has in a complete degree those properties of fluidity, mobility, elasticity, and equality of pressure in every direction about any point in a volume of it at rest, that distinguish the gases; and in consequence of which it is brought under the ordinary laws of pressure, equilibrium, and movement of gaseous fluids, as given in the article PNEUMATICS. At the same time, the rapidity with which, at a given condition and temperature, it can be condensed, or again formed, and the great disturbances in its heat and elastic force or pressure that occur at the moments of such changes, strikingly distinguish it from the permanent gases, and in fact impart to it its peculiar fitness as a medium through which to apply the motive power of heat.—It will be remembered that the agency we call heat exists free in all bodies upon and about our globe; and that, whenever in any body or space an excess of this free heat is in any way caused to appear, as by combustion of wood or coal, or the action of the sun's rays, this excess at once tends to be imparted to and equalized throughout surrounding bodies and spaces, at such rates as the nature of the latter, their surfaces, &c., will allow; while, if at any place a reduction of heat occurs, the surrounding bodies and spaces impart heat to this, and again with a rapidity depending on their nature and the character of the surfaces separating or bounding them. Now, between the particles of all fluids there is acting at all times a repulsive force or energy, greater or less, tending to drive the particles asunder; if the body be a liquid, to throw it into the gaseous condition; if a gas, to enlarge still further its volume. It is this repulsive energy that, as we pump off the surrounding atmosphere from about a tight bladder holding a little air and placed in the receiver of an air pump, goes on distending the bladder, till it may even burst it from within outward. The repulsive action in these bodies is moreover known to be either directly that of heat, or such as heat directly conspires with and augments. And as the small body of air confined in the bladder is, in the atmosphere, kept by pressure of the surrounding air within a moderate volume, so it is found also that a vast number of liquids—those termed volatile—at any ordinary temperatures owe their liquid state to the superincumbent pressure of the atmosphere upon their surfaces. Water is, for all temperatures above its freezing point, a perfectly volatile liquid; so that if we should introduce a pint of it, at any temperature from 212° down to 32°, into a perfectly vacuous space large enough to contain the resulting perfect vapor, the whole of the liquid would vaporize instantly and disappear in the gaseous form. The only other condition necessary to this result is, that the bodies in contact with the liquid when introduced shall be able to yield to it a sufficient amount of heat to convert it as stated; this heat becoming latent in the vapor, and the bodies parting with it becoming correspondingly cooled. In so vaporizing the water, also, as the temperature taken for the change was lowered, the vapor itself when formed would have a feebler elastic tension, and would be less dense; so that a larger vacuous space must be continually provided as we approach 32°, to insure the rapid and complete volatilizing of the liquid. But if into the vacuum some air were introduced, and the experiment repeated, the vaporization of the liquid would be retarded, and more—finally even to nearly preventing it altogether—as the density and pressure of the admitted air were increased. This repressive effect of the incumbent air, however, could always be overcome by artificially applying a sufficient degree of heat to the liquid. And when the atmospheric pressure equalled its average at the sea level, 14.7 lbs. avoirdupois to the square inch of surface, if heat sufficient could be supplied, any quantity whatever of water would still vaporize and become steam instantly, against and in spite of such pressure, at the moment when the temperature of the entire liquid mass became raised to 212°. Thus; while evaporation takes place slowly at all temperatures, down to and below zero of Fahrenheit, giving vapor of feebler tension and less density—the tension at 0° equalling $\frac{1}{16}$ inch of mercury—a vaporization of whole volumes of liquid (larger or smaller, according to the facility with which the requisite heat can be supplied to enter into the latent form, or give to the resulting vapor its tension) must commence in any body of water or other liquid so soon as the tension of its vapor is made equal to the pressure of air or other gaseous bodies upon the surface of the liquid. It is this tumultuous vaporization that we call boiling; its rate being really slow, and the process prolonged, only (and fortunately, in view of the risk otherwise of continual explosions) by reason of the fact that but a limited and gradual supply of heat can, under any circumstances, be made to enter the liquid. The principal fact here, and the one never to be lost sight of, is, that any liquid in ordinary conditions vaporizes in volumes, *i. e.*, boils, at the precise moment when the tension of its vapor due to heat has risen to an equality with the pressure of that atmosphere, whether of common air, or of confined vapor already formed, which rests or presses upon its surface. And no matter how the vapor forming is in the main enclosed, if there be but one small aperture in the boiler, the cylinder, or other passages, through which the atmosphere without can transmit its pressure, and any excess of vapor within above that pressure can escape, it is still the atmospheric pressure precisely that acts upon the liquid surface. Hence it is seen that, the character of the vessel and other conditions being like, and the incumbent pressure the same, the temperature of ebullition of the liquid remains always the same; that under a given pressure the temperature of the liquid remains constant through the whole period of the ebullition, a greater quantity of heat communicated to the liquid having only the effect to evolve during a given time a larger volume of steam; that the elastic force or tension of steam forming at 212° F. is precisely equal to the weight of the superincumbent atmosphere, or very nearly 14.7 lbs. per square inch; and that when, by confining the vapor obtained, its density and pressure are increased, a higher temperature becomes necessary to secure ebullition, and we say that the boiling point is raised. Steam forming by boiling at 212° is thus said to have a tension or pressure of 1 atmosphere; at 234°, of 1½ atmospheres; at 250°, 2; at 264°, 2½; at 274°, 3; at 292°, 4; at 306°, 5; at 340°, 8; at 357°, 10; at 389°, 15; and at 415°, 20 atmospheres, or about 294 lbs. per square inch. Generally, as produced over or in communication with water of its own temperature at the moment of its formation, steam is at its maximum of density for the temperature, whatever that may be. Under such circumstances, however, the steam mass owes a part of its actual density to the holding of more or less of finely divided water or mist in suspension through it. In whatever its density may consist, the greatest pressure under which steam can exist at a given temperature, as steam, is also the least pressure under which water similarly heated can retain the liquid form. This is called, for the given temperature, the pressure of saturation; and the steam is said to be saturated. On the other hand, steam refuses to generate freely or in volumes with less than this maximum quantity of vapor. That is, steam and water thus conditioned are, so to speak, at an equipoise; increase of heat will increase the quantity of water vaporized, and so, in a confined space, the density of the vapor; or increase of pressure will compel a portion of the vapor already formed to resume the liquid state. The steam stands, at the same moment, at the condensing point and at the generating point; and in fact, throughout the entire range of heat, there will occur at every point, in unalterable conjunction, one density, one pressure, and one temperature; and always, the density being given, the other elements will correspond. Of course, when change in one of these particulars occurs, slight lapses of time must be allowed the others to adjust themselves to this; but the agreement of all the conditions just expressed is that to which the steam mass communicating with the water in the boiler is always tending. If from steam under more than one atmosphere of pressure, and the temperature and density of which are proportionally increased, some heat be withdrawn, the tension and hence the density fall, and part of the steam resumes the state of water. If, while the temperature remains constant, the space or volume over the water be increased, then, so long as there remains an excess of liquid to supply fresh vapor for the augmented space, the density and tension will not diminish, but remain constant at the maximum due to the given temperature. If, after all the liquid is evaporated, heat be not added to the steam mass, but the space or volume be enlarged, the steam expands, and its density and pressure diminish, as in the permanent gases. If, then, the volume be again reduced, the density and pressure increase, until they return to the maximum due to the temperature, reaching the condensing point; and the effect of further diminution of volume must be precipitation or liquefaction of corresponding quantities of the vapor, the density remaining constant, and even until the whole mass of vapor had thus been forced back to the liquid condition. If, after all the liquid is evaporated, or a portion of it has been separated in any way from the water surface, the application of heat be continued, the state of saturation is left behind; and even if the same density be preserved, the tension or pressure is increased, though not so rapidly as if with the same increase of temperature the steam could remain in contact with the water, and so continue to maintain through this rise the condition of saturation. The steam so separated and heated loses the moisture which may accompany it in the saturated state, and at a few degrees of added temperature acquires in full the character of a perfect gas; it is then said to be surcharged with heat, and it is known as gaseous or subsaturated steam, more commonly as "superheated steam," and is by some writers termed "stame." Let steam in this condition be replaced in contact with the water in the boiler, or in any way brought into free communication with it—the water having yet the original temperature—and such steam would immediately evaporate and absorb a further portion of the water, transferring to this its excess of heat, and would become saturated, its temperature falling to that of the water.—The relation, generally, of heat to the production of mechanical effect, or work, is considered under HEAT. The unit is the mechanical equivalent of the heat required to raise through 1° F. 1 lb. of water; and this, experiment seems to show, is 772 lbs. weight raised against gravity through 1 foot of height, *i. e.*, 772 foot-pounds. If 1 lb. of water at 212° be injected into a vacuous space of 26.36 cubic feet—this being the volume of 1 lb. of saturated steam at that temperature—and if it be evaporated into such steam, there will be expended in the process 892.9 units of heat. Now let a second pound of water at 212° be injected into and evaporated in the same space; and this, having to assume its volume or advance against a pressure of 14.7 lbs. per square inch, will perform work to the amount of 26.36 × 144 × 14.7 lbs. = about 55,800 foot-pounds; and since $\frac{55800}{772}=72.3$, this quotient will be the number of additional units of heat that must in such case be consumed or expended in displacing the first steam atmosphere, against which the second must advance; so that to convert the second pound of water into steam against this pressure will require 965.2 units of heat. When steam flows from the boiler into vacuous space, without performing work, its temperature, chiefly by reason of its friction against the edges or sides of the passages it moves through, is considerably raised. But if, in so expanding, it must meanwhile perform the work of lifting or pushing a piston or other movable load, the theory requires that in so doing it shall lose a corresponding portion of heat, and that, if it were before at the point of saturation, by the cooling that results a portion of the steam shall return to the liquid form; and it is believed that practical observations and tests confirm this result of the thermo-dynamic theory.—From the known rate of expansion of perfect gases, it is inferred that were a given volume of a gas, as air, for example, continually cooled, its volume would uniformly diminish; and that at —461.2° F., or 493.2° below the freezing point of water, it must wholly collapse, its elasticity and volume becoming 0. This point, then, —461.2°, is considered as the "absolute zero" of heat; and temperature reckoned from it is "absolute temperature." If a given volume of air, under a constant pressure, be heated from 0° F. through 461.2°, its volume is doubled; heated through 2×461.2, its volume is tripled; and universally, the volume is augmented $\frac{1}{461.2}$ part for every addition of 1° of heat. This expression also gives the rate of expansion or contraction for superheated steam. For the permanent gases and for superheated vapors, then, the laws respecting volume and pressure may thus be briefly stated: 1, the temperature remaining constant, the tension or pressure varies inversely as the volume; 2, the pressure constant, the volume varies directly as the absolute temperature; 3, the volume constant, the pressure varies directly as the absolute temperature. Now, omitting for the moment any effect of specific heat, the amount of heat that must have entered, in vaporizing it, a pound of water vapor, will be found to consist always of two readily distinguishable parts: first, the whole amount of the heat required to raise the liquid, before evaporation takes place, from some fixed temperature to that of the evaporation, *i. e.*, the "sensible heat;" secondly, the whole amount of the heat which disappears in the process or work of converting the pound of water already at its evaporating point into vapor, *i. e.*, the latent heat of evaporation. In reckoning the sensible heat, it is not necessary to start from the absolute zero; and as the most convenient point, and one sufficiently low to underlie all ordinary calculations about steam, 32° is adopted as, for these cases, the 0 of the sensible temperatures considered. The sum of these two parts of the heat contained in steam, the sensible reckoned from 32°, and the latent of evaporation, is termed the total heat of evaporation, or total heat of steam. As the sensible heat is very readily and nearly determined in all cases, it has been, ever since the complete development of the capacities of steam mechanism by the inventions of Watt, an important problem to ascertain precisely the amount and rate of variation of the latent heat of the vapor. The estimates arrived at, for the latent heat of 1 lb. of water at 212°, have varied from that of Dr. Black, at 810°, to those of Count Rumford, 1050.5°, and of the committee of the Franklin institute, Philadelphia, 1037°. (For details of apparatus and methods in these, as well as in the experiments of Regnault, see the works of Tredgold and Bourne on the steam engine.) It was during such researches, also, that the supposed laws of Watt and of Southern were arrived at; the former that "the total quantity of heat necessary to vaporize a given weight of water was the same at all sensible temperatures," the latent heat diminishing as the sensible heat was raised; the latter, conflicting with that of Watt, and still more erroneous, that "the latent heat of vaporization was the same under every degree of pressure." In Régnault's experiments and calculations, probably conducted with the utmost attainable precaution and accuracy, the total heat of evaporation at 0° C., = 32° F., was determined as equal to 606.5° C., =1091.7° F. He also found that, between 0° and 230° C., the total heat of saturated steam increases (a slight change in specific heat being here disregarded) uniformly by .305° for each added degree of heat. This result also determines the specific heat of ordinary steam as .305, that of water being 1. Letting t represent the indicated temperature in any case, and conforming the expression to the observed total heat at 212°, Regnault's formula for total heat at all temperatures, in degrees F., is $H=(1113.4-32)+.305t$; or, $H=1081.4+.305t$; so that the total heat of saturated steam at 212° is 1146° F. This is the total consumption of heat if the water be supplied at 32°. When the water is supplied at temperatures above this, for 32 in the formula substitute the given temperature. Thus, taking cold water at average temperature, $H=(1113.4-62)+.305t$; or, $H=1051.4+.305t$. If, as in condensing engines, the water be at 100°, then $H=1013.4+.305t$. If the water be supplied at boiling point, allowing .9° for specific heat, then $H=(1113.4-212.9)+.305t=900.5+.305t$. And converting the formula given by Clausius for the latent heat of steam, we obtain in Fahrenheit's scale, $L=1115.2-.708t$. Let it further be borne in mind that the same figures which above express in degrees the relations of the constituent heat of steam, in form of ratios merely, and not as absolute quantities, will also express positive values, in units of heat, if we assume the quantity of steam as 1 lb. weight, so as to accord with the requirements of the thermal unit. The appropriation of all the heat contributing to the formation of 1 lb. of saturated steam at 212°, and given both in units of heat and of work, will now be understood from the following tabular statement:

	Units of heat.		Mechanical equivalent, in foot-pounds.
A. The sensible heat:			
1. To heat the water from 32°, or through 180°	180.9°	=	139,655

B. The latent heat:	Units of heat.		Mechanical equivalent, in foot-pounds.
1. To convert the water to vapor, irrespective of pressure on surface	892.9°	=	689,242
2. To advance against and remove the incumbent atmosphere, whether air or previously generated steam, its pressure being 2,116.8 lbs. per square foot of surface...	72.3°	=	55,815
Total latent heat	965.2°	=	745,057
Total heat of steam........... ...	1,146.1°	=	884,712

It becomes evident at the same time, that the total latent heat of steam cannot be taken as in any way the measure of the energy or work in, or that can practically be obtained from, the steam. Much the larger part of such heat is expended in merely overcoming the cohesion of the liquid; and at all temperatures, it is but a small fraction of the latent heat that can be made available in performing work.—Water at 212° and under one atmosphere, becoming steam, is ordinarily said to expand into a volume 1,700 times greater than that occupied by the water itself. The increase of volume is, however, always less than this, being differently stated at from 1,670 down to 1,642 times the original volume. It is remarkable that the uncombined oxygen and hydrogen gases composing the same weight of steam, at the same temperature and pressure, would occupy 2,500 times the volume of the water. Thus, the density and pressure of actual steam always exceed those which the ideal steam, or that on the supposition of a perfect gas, would exhibit. By means of recorded observations of experiments on steam, and finding the mean of the most trustworthy results, with the further aid of formulas and calculations, some of which are in this article intimated rather than detailed, very full tables of the properties of saturated and of superheated steam have been prepared. Of such a table for saturated steam, a brief abstract only can here be introduced.

TABLE OF PROPERTIES OF SATURATED STEAM.

Total pressure per square inch.	Temperature in degrees.	Total heat in degrees above 32°.	Latent heat in degrees.	Density, or weight per cubic foot.	Volume of 1 lb. of steam.	Relative volume, or No. of cubic feet of steam from 1 of water.
Lbs.	Fahr.	Fahr.	Fahr.	Lb.	Cubic feet.	Ratio of volume.
1	102.1	1,112.5	1,042.9	.0030	330.36	20,582
10	193.3	1,140.3	973.4	.0264	37.84	2,358
14	209.6	1,145.3	966.3	.0362	27.61	1,720
14.7	212.0	1,146.1	965.2	.0380	26.36	1,642
15	213.1	1,146.4	964.8	.0387	25.85	1,610
18	222.4	1,149.2	957.7	.0459	21.78	1,357
21	230.6	1,151.7	951.3	.0531	18.84	1,174
24	237.8	1,153.9	946.9	.0601	16.64	1,036
30	250.4	1,157.8	937.9	.0743	13.46	838
35	260.9	1,161.0	930.5	.0881	11.34	707
45	274.4	1,165.1	920.9	.1089	9.18	572
60	292.7	1,170.7	908.0	.1425	7.01	437
75	307.5	1,175.2	897.5	.1759	5.68	353
90	320.2	1,179.1	888.5	.2089	4.79	298
105	331.8	1,182.4	880.7	.2414	4.14	257
120	341.1	1,185.4	873.7	.2738	3.65	227
135	350.1	1,188.2	867.4	.3060	3.27	203
150	358.3	1,190.7	861.5	.3377	2.96	184
180	372.9	1,195.1	851.3	.4009	2.49	155
210	386.0	1,199.1	841.9	.4634	2.16	135
240	397.5	1,202.6	833.8	.5248	1.90	119
270	407.9	1,205.8	826.4	.5868	1.70	106
300	417.5	1,206.8	819.6	.6486	1.54	96

As in case of all gaseous bodies observable near their point of liquefaction, steam diminishes in volume and tension, and increases in density, more rapidly as it approaches near to condensation, than under like variations of pressure when it is heated much above that point; but the amount of such irregularity is not ascertained. The density of steam is expressed by the weight of a given constant volume, usually that of a cubic foot; its relative volume is the ratio of its actual volume to the volume of the water producing it. The density and relative volume of saturated steam have been determined with tolerable accuracy, by comparison of the quantities which experiments have furnished us, in connection with the elements of pressure, temperature, and latent heat.—**STEAM ENGINE.** I. *History.* The history of the steam engine is not the history, in full, of the discovery and application of the force of steam. The steam engine proper, first produced and patented by Watt in 1768–'9, is not yet (1862) 100 years old; but the more obvious properties of steam, and among them its expansive force, were understood and treated of, and mechanical effects by its agency produced, before the Christian era. In respect to the earlier experiments with steam, comparatively little is now known. Heron, in his "Pneumatics," about 230 B. C., describes three different, but simple contrivances showing mechanical effects of steam. No further advance is known to have been made until the 16th or 17th century of our era, when, through the impulse given by the new art of printing, the works of Heron and Archimedes were disseminated and much read, and an age scarcely second to our own for the great number and variety of its mechanical contrivances was entered upon. Blasco de Garay of Barcelona, in 1543, is said to have propelled a vessel of 200 tons by paddles, with "a water boiler, liable to burst;" a statement to be received with much hesitation. In 1601 Giambattista della Porta described in his "Pneumatics" an apparatus of his for raising water by a tube into a close vessel, in which a vacuum had been obtained by condensation of steam. In 1615 Solomon de Caus, a French engineer, published in his *Raisons des forces mouvantes* the statement that by fire water is dissolved into an air with such violence as to burst a closed copper ball containing a small quantity of it, and highly heated; and he described the propelling of a jet of water, by pressure on its surface in the vessel, of steam generated from it. In 1629 Branca, an Italian engineer, described a machine in which a wheel was driven round by the impulse of steam against vanes. The first engine in which steam was applied to the performance of useful work, seems to have been that invented by the marquis of Worcester, and described by him in his "Century of Inventions (1663); his description, so far as it is intelligible, indicating that steam was generated alternately in two vessels, and by pipes transferred and made to exert a pressure upon the surface of water in a third; the water was raised, as he tells us, continuously to a height of 40 feet, one vessel of the vaporized water being sufficient thus to elevate 40 times its volume of cold water. Cosmo, grand duke of Tuscany, relates that he saw one of these machines in use at Vauxhall in 1656. The separate boiler seems to have been the original part of this invention. Dr. Denis Papin, well known as the originator of "Papin's digester," experimented much on the production and force of steam from 1695 to 1707, and at the former date first devised and employed a piston within a cylinder, and under which a vacuum was produced by condensation of steam. His plan was not practically realized in any form. He had previously invented the safety valve for boilers. In 1698 Capt. Thomas Savery secured letters patent for a machine for raising water by steam. It consisted of two boilers and two receivers for the steam, with valves, and the needful tubes. One of the receivers being filled with steam, its communication with the boiler was then cut off, and the steam condensed by cold water outside it; into the vacuum thus formed the atmosphere forced the water from below, when the steam was again caused to press upon the surface of the water and drive it higher. This engine was extensively used for draining mines; and the water raised was, in some instances, made to turn a water wheel, by which lathes and other machinery were driven. Some of the earliest cotton mills of Lancashire were thus supplied with power. As Papin's machine involved great waste of time, so did Savery's a very considerable waste of steam in reheating the cooled receivers, and in heating at the first the surface of the water to be raised. In 1705 Thomas Newcomen, a smith, and John Cawley, plumber, of Dartmouth, along with Savery, patented an engine combining for the first time the cylinder and piston and separate boiler, doubtless deriving the former from Papin's plan. Steam was admitted beneath the piston, and condensation at first secured by application of cold water without the cylinder; the pressure of the atmosphere forced down the piston, and in so doing worked a pump rod for raising water attached at the opposite end of a rude working beam, actuated by the piston rod. Thus, this was really an atmospheric pumping engine. Through the accident of a hole in the piston, letting the cold water directly into the cylinder, they discovered the superior rapidity and effectiveness of such condensation, and substituted the cold jet into the cylinder accordingly. The valves were opened and closed by hand, until a boy named Humphrey Potter, to gain time for play, substituted an apparatus of catches and strings, thus making the engine automatic. The contrivance first used was very clumsy; and it was wholly removed by Henry Beighton, who in 1788 first worked the valves by a rod direct from the beam. In the mean time, many attempts at producing other forms of steam mechanism were being made in England and on the continent. The most important of these in principle, because containing the germ of the non-condensing or high pressure engine, was that of Jacob Leupold, a German, who in 1725 fitted directly upon a large boiler two cylinders, the steam and the escape passages of these being alternately opened and closed by a four-way steam cock; and who introduced beneath the pistons steam of comparatively high pressure, which was made to act against the atmosphere, *plus* the work of pumping water by means of a beam and pump rod actuated by each of the pistons. As Newcomen's atmospheric engine became extensively introduced for draining collieries and mines, and was found to effect a great saving of expense, its capabilities were soon fully tested, and indeed exceeded, by the demand for its use. The cylinders were enlarged from 12 to 60 inches diameter, and the other parts in proportion; so that the engines became gigantic, and required for their construction a degree of skill then rarely possessed. At this juncture, 1765–'74, John Smeaton devised a succession of improvements in the atmospheric engine, and carried it to its utmost perfection. This was still called the "fire engine," being so named even in Watt's earlier memoranda and patents, and the improvements in it had thus far been empirical only; the force was exerted in but one direction; the total pressure could not exceed that which air exerts, and in fact always fell short of it, because the vacuum beneath the piston was far from complete; while the purposes to which such an engine could be applied were necessarily very limited. The improvement of the engine on scientific principles commenced with the labors of Watt, who, while repairing a model of Newcomen's engine, discovered its various defects, and began to devise the methods of remedying them. He reflected that, "in order to make the best use of the steam, it was necessary, first, that the cylinder should be maintained always as hot as the steam which entered it; and secondly, that when the steam was condensed, the water of which it was composed, and the injection itself, should be cooled down to 100°, or lower where that was possible." The means to these ends occurred to his mind in 1765; namely, the separate condenser, in which condensation of steam, effecting its removal from the cylinder, was to be secured by cold water surrounding or injected into the reservoir for the purpose, the accumulating water to be removed by a pump. It next occurred to him that the open mouth of the cylinder must allow the latter to be cooled by the air following the piston, and that consequently some of the steam next admitted must be condensed. He therefore proposed to "put an air-tight cover upon the cylinder, with a hole and stuffing box for the piston rod to slide through, and to admit steam above the piston to act upon it instead of the atmosphere." To prevent cooling of the cylinder by the external air, he would surround this by a larger one, the "jacket," the interspace to be kept filled with steam, and would cover or clothe the whole with wood or other substance conducting heat poorly. Thus, we must credit to the marquis of Worcester the first successful application of steam pressure to use; to Savery the application of the vacuum due to condensation, though he did not foresee the true method, or the full value of its application; to Papin the piston for receiving and transmitting the force of air or steam within a cylinder; to Newcomen and Cawley the cylinder and piston independent of the boiler, as also the working beam, and the plan of internal condensation; to Beighton the successful introduction of automatic apparatus for the valves; and to Watt the separate condenser, saving the cooling of the cylinder and consequent waste of steam in reheating it, and the exclusion of air from the cylinder, with introduction of steam above the piston, changes which, with those that followed and grew out of them, rendered the engine at length practical, economical, and complete. This was still a "single-acting" engine; the steam pressure during the pushing down of the piston being that alone which took effect on the mechanism to be driven, and the only object of the subsequent admission of steam below being to return the piston to the top of the cylinder. This engine was also chiefly used for pumping and draining. It seems to have occurred to Watt, as early as 1769, that additional economy would be secured, especially, as he thought, in working light loads, by closing the steam pipe before the piston had descended the full length of stroke, thus saving the filling of the cylinder completely with steam of the initial density, and allowing the stroke to be completed by expansion of that already admitted, aided of course by momentum of the beam and piston. This principle he first applied in 1776 in an engine erected at Soho, but he published no account of it until on patenting this and certain other improvements in 1782; the variety he named the expansive engine. The first public announcement of benefit from expansive working of steam, however, was by Jonathan Hornblower, who in 1781 employed two cylinders, one larger than the other; the steam, of the boiler pressure, having first driven the smaller piston, was immediately transferred, and allowed to act during its expansion (of course with diminishing pressure) upon the increased area of the larger piston, the two cylinders being thus approximatively equal in power. Watt's general patent, however, was judged to exclude this invention, and it did not at that time come into use. In the single-acting engine, one half the motion was still unaccompanied by useful effect; and the application of the force was ill adapted to impart any other than a simple reciprocating movement. Since the time of Savery, it had been an object of importance with inventors to convert this movement into one of revolution, as adapted to machinery; and Hulls, Fitzgerald, Stewart, and others had contrived various means of effecting this change. Watt early conceived of the use of the common winch or crank for this purpose; it was patented, however, by Wasbrough, and then by Steed, in 1781. As Watt was at this time engaged in his invention by which the engine was to be made "double-acting"—the steam being admitted to press alternately, and in turn condensed, both above and below the piston—thus fitting it to impart revolution to a shaft, to wheel work, &c., he was obliged to resort to other methods to secure this part of his purpose, among them to the "sun and planet" wheel. The adaptation of the engine to the production of a rotary motion prepared the way for its employment as the prime mover of every kind of machinery. The specification of the double-acting steam engine, with several kindred improvements, was enrolled July 4, 1782; and in 1784 patents were secured for the "parallel motion," the throttle-valve, the governor, the indicator, &c.; as also for a form of locomotive engine, which however proved impracticable. Among the earliest of the double-acting or rotative engines produced for sale was the Albion mill engine, fig. 1; an inspection

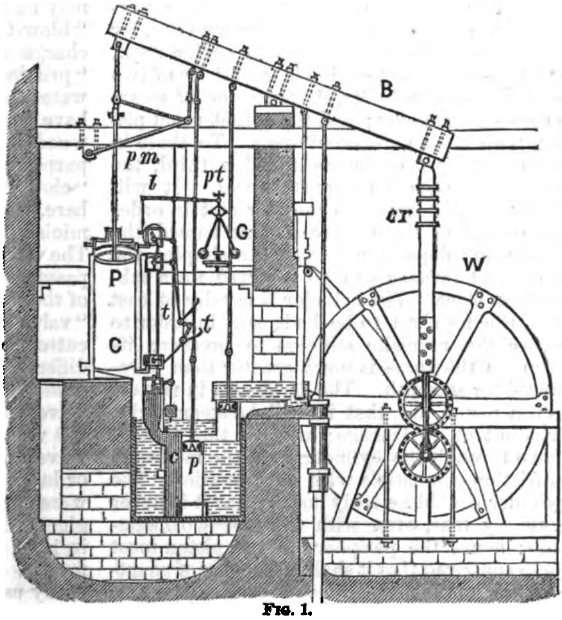

Fig. 1.

of which will serve not merely to show the earlier form of construction, but also to illustrate many points hereafter to be referred to in respect to ordinary forms of engine. In 1787, or according to some authorities even before 1785, Oliver Evans of Philadelphia constructed the first complete and practically working non-condensing or high pressure engine, thus paving the way by economy of space and comparative simplicity of the mechanism required for the locomotive engine and the adaptation of steam to purposes of land carriage. Of the immense number of inventions since that date, intended to improve the form, the working, or the economy of the steam engine, or to adapt it to specific purposes, it would be impracticable here to detail the whole; some of the more important will be named in connection with the description of parts and forms of engine, or with the explanation of its working. II. *Essential Parts of Ordinary Forms of Engine.* Being a contrivance for applying motive power to machinery, pumps, carriages, the shafts of paddle or screw steamers, &c., the steam engine proper always terminates with that working piece which directly transmits the power; as, in the commonest forms, with the connecting rod from the beam to the crank. The fly-wheel, governor, valve motion, or other parts that receive their motion from the main shaft (crank shaft), and that are useful only in relation to the engine, must be considered in connection with it; through these parts a portion of the propulsive effect is thrown back, for certain needful purposes, upon the engine itself. The non-condensing engine is essentially of two main parts: the boiler, or generator of steam with its appendages; and the cylinder and piston, with their various adjuncts. To these in the condensing engine is added a third, the condenser, with its appurtenances. It will conduce to clearness to consider first in order the second of these three, as just named, the condensing apparatus being quite simple; the boiler and furnace will be reserved for a subsequent place. The cylinder is usually of cast iron, the toughest to be had; and in order to secure the requisite stiffness to preserve its form, its thickness is much greater than is required for strength. The desiderata in respect to the piston are, that it shall be steam-tight, or admit of no leakage; and yet that it shall move through the cylinder with the minimum of friction compatible with this condition. The cylinder should be truly bored; but it is never perfectly true, even with the best workmanship; hence the periphery of the piston must be so contrived that it shall be capable of adapting itself to the inequalities the surface presents. In common pistons the packing is of unspun hemp or soft rope, wound about the periphery, and between a plate and flange, and saturated with grease. Metallic pistons of several varieties—the first being patented by Cartwright in 1797—are chiefly used in the better class of engines. These are usually of brass or cast iron, and composed of segments pressed outward by springs radiating from a centre. Steam packing is now much in use, the periphery of the piston being in segments, with cavities within the body of the piston, into which small orifices admit steam directly from the cylinder to secure the requisite pressure. The stuffing box is a packing about the piston rod, where it passes through the cylinder cover. The pipe conveying steam from the boiler to the cylinder is the "steam pipe" S, fig. 4; in it is the "throttle-valve," controlled by the governor G, fig. 1; sometimes a stop-valve, to be shut when the engine is not in use; and a "cut-off" or expansion valve may also be placed in it. The passages leading from the steam pipe into the cylinder are the steam passages, steam ways, or "nozzles," A B, fig. 2, and are opened and closed by the "induction valves;" if the openings to the exhaust pipe (that for escape of the steam after use from the cylinder), E, figs. 2 and 3, are controlled by separate valves, these are the "eduction valves." Very commonly, as will appear, the entrance and exit of steam for both ends of the cylinder are managed by two valves only, or by a single one. The orifices for steam from the passages directly into the cylinder are the "ports;" but this name is quite as commonly given to the opposite ends, *o o*, fig. 2, of the steam passages, directly under the valves. An escape valve, held by a spring, may be placed at each end of the cylinder, or "blow-through," or cylinder cocks, for discharge of water due to condensation or to "priming," *i. e.*, the carrying over of liquid water from the boiler. The jacket and its use have been referred to; the covering of felt and wood often put upon the cylinder for a like purpose, or over the outer cylinder, is the "clothing," or "cleading." If the cylinder is bare, it is usual to keep it well polished to diminish the cooling that results from radiation. The valves, and sometimes portions of the steam passages, are included within a chest alongside of the cylinder, and of less size, and called the "valve chest," *c*, fig. 4. For controlling the entrance and exit of steam at the ports, many different sorts of valves are in use. The two classes most commonly employed are the "slide valve," certain varieties of which are called "D valves," and the spindle, "T," or "poppet valve," in certain forms known as the conical or button valve. Flat or double conical valves were the first used by Watt in his earlier engines. The slide valve was applied by Murray in 1799, being adapted from Lavoisier's slider for the air pump with two barrels. It is generally used in European countries, and in this country in locomotive and frequently in marine engines. It acts by sliding upon that inner surface of the valve chest, made accurately plane, which faces the cylinder, and is named the seat, or valve seat. The original or short D valve, still much in use, is shown in fig. 2, its form a partial D, with flat extremities for covering

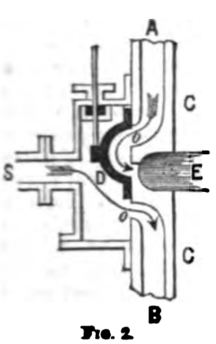

Fig. 2.

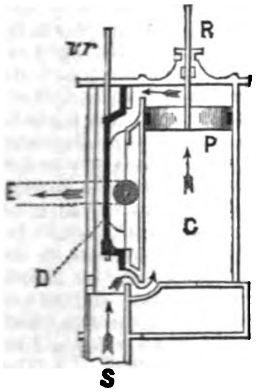

Fig. 3.

the ports, while its concavity always includes and communicates with the exhaust pipe. The valve chest is, while the engine is in use, kept supplied through the steam pipe with steam directly from the boiler, which thus fills the chest continually; the manner in which, as the valve is by movement of its rod thrown forward, the steam passage into the cylinder at one end will be opened to the steam in the chest, while the other is opened to the exhaust, and the reverse on return of the valve, will be obvious upon inspection of the figures (2, 3). The waste, with this form, of the steam to fill long passages, led to the invention by Murdoch of the long D valve, fig. 3, which allows of shortening the passages, by placing the ports near the ends of the cylinder; and to save weight, this valve has since been simplified into a rod with short slides at the ends. A conical or poppet valve may be compared to a button or solid disk fixed upon the valve rod transversely to its length; in the movements of the rod it is alternately lifted out of and returned upon an aperture within the chest, and thus allows or denies access of steam through this. If an induction valve, one of its faces is toward a space kept filled with steam from the boiler, and when lifted it lets this steam into the end of the cylinder at which it is placed; if an eduction valve, one of its faces is toward the vacuum in the condenser, or the atmosphere, the other toward the interior of the cylinder, and when lifted it opens communication between these. These actions are made to take place alternately for the two ends of the cylinder, by movement of one or of two valve rods, as 2 or 4 such valves are used. The valve rods are actuated in various ways; sometimes by a separate rod called a plug-tree, engaging the rod at the proper moments by tappets or cams, which strike levers or handles upon it; more commonly at present by means of one "eccentric," or two such on the crank shaft. The eccentric, *e*, fig. 4, is a circular plate of metal fixed on the shaft, M, in a position out of centre, and sliding within a ring; as the shaft turns it gives a reciprocating movement or throw to the eccentric rod, *e r*, proceeding from the ring; and this rod is made to actuate the valve rod, either by a simple joint, by joints and a lever or link, or by tappets as before named. In fig. 4 is readily traced the communication of motion from the piston to the crank, K, and shaft, and thence to actuate the valve, V. The entire arrangement for working the valves is the valve gearing or "valve motion;" and if two eccentrics are used, they are differently set on the shaft so as to have their throw at different moments. The pressure on the back of a simple slide greatly increases the friction against the valve seat; and several devices have been resorted to in which the back of the valve chest is also made a plane, and the steam admitted between two parts of the valve is made to press it equally against those opposite faces; such are "equilibrium" or "balance slide valves." So in the simple poppet valve, pressure from one side only interferes with prompt and easy working; to remedy this, each valve is made of two disks, so as to receive pressure in opposite directions. Let the space *c b e d*, fig. 5, be the opening to the cylinder; A B is a double or "balance poppet valve" for steam, C D for exhaust. The

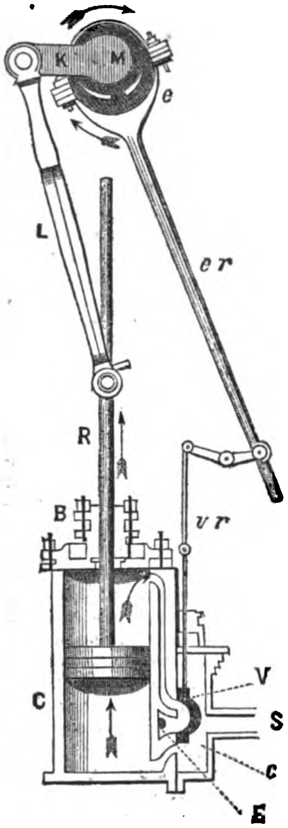

Fig. 4.

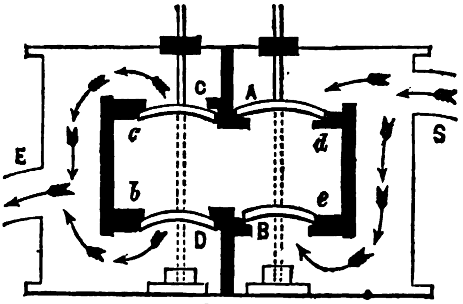

Fig. 5.

steam acting on A'B from without, A is made larger; acting on C D from between the disks, D is made larger; and under this slight difference of pressures, though each double valve is kept in its seat, it is lifted or depressed by its rod without strain or jar. Many other forms of valve are in use. In engines of which the cylinders oscillate upon trunnions projecting from their sides, now much in use, and known as oscillating engines; and also in rotatory or rotary engines, in which the steam drives round a revolving piston, the methods of supplying steam differ greatly from those above. In oscillating engines the steam and the exhaust passages traverse each a trunnion and support on either side; and they may be self-acting, the movement of the face of the trunnion over that of the support establishing and closing connection of each passage at the right point in the movement of the piston; or a steam chest and valves are employed, controlled by one or two eccentrics. This form of engine has many advantages; but almost insuperable defects in it are the heating and wear of the rubbing surfaces, which, with the spreading effect of the steam pressure, tend to produce and increase leakage of steam. The piston rod of a beam engine is attached by its cross head to one end of the working beam; and the rise and descent of this rod imparts to the ends of the beam a reciprocating movement, which, through the connecting rod from the further end, turns the crank. When the power acts by thrust and pull of an inflexible rod upon a crank, there occurs at the same two points in each revolution a momentary cessation of the rotative impulse. These points of no action are called the "dead points," and the rod and crank standing at either is technically said to be "on the centre." Obviously, the rotative effect upon the crank will, in each half revolution, increase from 0 at the dead point to a maximum when the rod stands at right angles to the crank, and then diminish in reaching the next from maximum to 0 again. The earliest, and in stationary engines the still almost universal method of continuing the movement steadily over the dead points, is by application of the fly-wheel upon the crank shaft. This is an iron wheel, of large diameter, and the very great weight of which is concentrated almost entirely in its massive rim. Brought to move at a given speed, it serves as a reservoir either of momentum or of inertia; hence tends to equalize the movement of the crank, as well as of the engine and machinery. The diameter of the circle described by the crank necessarily equals the length of stroke of the piston. Another method of equalizing the rotative pressure on the crank, is that of causing a pair of engines to act at once on the same shaft, their pistons impelling a pair of cranks placed at right angles to each other, so that when the action of one crank is 0 the other shall be at its point of greatest force. The effect of the fly-wheel upon the engine or machinery can only be to prolong the transition from one speed to another; it cannot confine the working of the engine within the limits of variation that shall correspond to a desired average speed. The changes in the load or resistance worked against, as well as in the formation of steam in the boiler, are liable to be sudden and extreme. To confine the speed of the engine within certain limits is the office of the "governor," W, fig. 1. The number of forms now given to this is very great; but the principle of action in all is the same. The centrifugal tendency of heavy balls at the lower and free ends of two bars on an upright axis, is made to move a sliding collar and levers, and through these to control the throttle valve, which is fixed within the steam pipe like an ordinary pipe damper. On account of the friction of its axis and joints, the governor does not respond at once and completely to the speed impressed by the engine, and does not instantly compensate it. The later forms have usually in view to obviate this defect. Among them is the so-named centrifugal governor, in which two small balls swing on short bars from a single joint at the apex of the cone described in their revolution, and are caused to turn at a very high velocity; this arrangement not only works with less friction, but also by the more rapid revolution develops more speedily a centrifugal action competent to overcome that which remains. Evidently, the movement of the piston and its rod through the stroke should be rectilinear, or true in respect to a line which may be regarded as the axis of the cylinder, as otherwise the piston, stuffing box, and rod must be rapidly worn or wrenched out of form. In the engines called vertical, parallelism of movement is usually secured by the ascent and descent of the cross head of the piston rod within guiding grooves, in oscillating engines, the mere rocking of the cylinder continually adjusts it to the line of action on the crank; in other forms, generally, the piston rod is jointed, and parallelism of the rod below the joint, secured either by Watt's parallel motion or by guides. The former is much employed in English beam engines; it consists of an arrangement of levers and linkwork, *p m*, fig. 1, attaching to fixed points and to the piston-rod joint in such way that, while the end of the beam necessarily moves through the arc of a circle, this joint and the rod below it shall move in almost an exact straight line. The real movement is, with most of these combinations, still in a double curve resembling a much flattened 8. It is because the long strokes and cranks generally preferred in American engines would exaggerate the departure from a right line, that in this country the use of guides to secure parallelism is almost universal. The "condenser" is a steam-tight and air-tight vessel or chamber, usually near the cylinder, into which, through the exhaust pipe, the spent steam from the cylinder is discharged during each movement of the piston, and in which it is condensed, either by circulation of cold water over the surfaces of the reservoir containing the steam, or by injection of a shower or spray of cold water, or often in both ways at the same time. In condensing land engines, the injection water is supplied from the "cold well" which surrounds or encloses the condenser, and which is kept supplied by the "cold water pump," worked in beam engines by a rod from the beam. In marine engines the water enters directly from the sea by a tube or sort of inverted funnel pierced at top with small orifices, and rendered properly strong. The "blow-through" valves communicate from the cylinder to the condenser, and from the latter a "snifting valve" opens out to the atmosphere; all these are usually shut, but they are opened for blowing through steam in order to expel the air from the cylinder and condenser before the engine is set to work. The vacuum gauge on the condenser shows how much the pressure within it falls below the atmospheric pressure. Residual steam, air, and water are extracted from the condenser by the "air pump," also worked from the beam where that is present, and are discharged into the "hot well," from which by a tube these products are carried to the boiler and supply it with water, thus economizing much of the sensible heat resulting from condensation of the steam. "Surface condensers," now coming much into use, usually consist of a collection of tubes, of larger or smaller size, through or into which the spent steam is caused to circulate, and within which it is condensed by cold water surrounding the tubes, either as a current, or in form of a dense spray over their exterior. Of these the best now in use are probably Pirsson's and Sewell's. The cylinder and passages of the condensing engine being closed against the atmosphere, if a perfect vacuum could be instantaneously produced in advance of each movement of the piston, the total effect of pressure of the entering steam upon the piston would in all cases be utilized. Practically, this instantaneous and perfect vacuum is never attained; owing to time required for escape through the passages and imperfection of the condensation in the condenser itself, there is always a body of steam of low tension in advance of the piston, producing a residual pressure, and subtracting so much from the effective pressure of the entering steam on the other side of the piston. Still the resistance is less than that of the atmosphere; and a proportionate saving of steam power is realized in condensing engines. With steam, indeed, at one atmosphere, or not much above, the condenser is indispensable. As the steam is generated and applied at higher pressures, the gain by condensation becomes a smaller fraction of the total pressure applied, and the condenser is then, either for safety or economy, less serviceable. So, again, without condensation, the greater the pressure of the steam the less is the fraction or part lost by atmospheric resistance. And, simple as is the principle of the condenser, its application along with the parts subservient to it imparts to the engine a good degree of its complexity, and greatly increases the weight of materials and the space required for it. Hence, to render the engine portable, the condenser and its appendages had to be discarded; the piston must then be driven both ways against the pressure of the atmosphere. Beside, the steam which had driven the piston must be expelled after each movement of it into the atmosphere; here, first, the heat contained by this steam is wasted, and secondly, since the orifice for escape cannot be made as large as the mouth of the cylinder, there is some delay and compression of the escaping steam, and an added resistance upon the piston due to this cause. In its working, then, the non-condensing engine is the less economical, and requires greater strength; but the saving in original cost, to say nothing of the need of portability, goes far to compensate for those defects; so that this kind of engine has come into general use, not only for locomotives, but very commonly also in the forms of stationary engine, and frequently for steam craft, especially those intended for river navigation. The pumps being dispensed with in the non-condensing engine, the beam may be so likewise; the piston rod being directed by a cross piece and guides, and a crank rod from this cross piece directly impelling a crank with or without a fly-wheel. III. *Classification and Varieties of Engines.* This branch of the subject has of necessity been in part anticipated in considering the essential parts of ordinary engines. Dividing steam engines with reference to the most essential distinction to be made between them, *i. e.*, the physical principles upon which they are worked, we have the following two classes and principal varieties under each:

A. CONDENSING ENGINES—"LOW PRESSURE."

1. Acting by condensation only	Atmospheric engines.
2. Acting by pressure and condensation	Double-acting engines.
3. Acting by pressure, expansion, and condensation	" "

B. NON-CONDENSING ENGINES—"HIGH PRESSURE."

1. Acting by pressure only	Double-acting engines.
2. Acting by pressure and expansion.	" "

Secondly, classifying with reference to the kind of movement the engine is to impart, we have: A, non-rotative engines, applying force directly by alternating movements, as in pumping, direct-acting steam hammers, &c.; B, rotative, giving movement to a revolving shaft, now rather the exceptions than the rule. Thirdly, in reference to the general purpose of their use, engines are: A, stationary, for propelling machinery, &c.; B, portable, for removal from place to place, but stationary while in use, as for sawing, pile-driving, &c.; C, marine, for propelling vessels; D, locomotive, for propelling vehicles on land. Fourthly, with reference to the mode of applying the action of the piston rod of ordinary cylinder engines, we have: A, beam engines; as 1, ordinary beam engines, the beam above; 2, "side lever" engines, much in use in paddle steamers, the beam being placed below the level of the cylinder cover, and worked by a rod or rods descending to it from the cross head of the piston rod; B, direct-acting engines, in which the piston rod acts directly upon the crank; as 1, direct-acting horizontal engines, stationary; 2, direct-acting vertical engines, stationary or marine, in some forms known as "steeple" engines; 3, oscillating engines. Rotatory, disk, and certain other peculiar forms of engine are also direct-acting. Among the advantages of direct-acting over beam engines are the saving of space, of liability of damage to the cylinder from breaking down and fall of the beam, and of some useless load and friction; the parts transmitting the power in direct-acting being generally less than in beam engines, in the ratio of 2 : 5. The Corliss steam engine company, of Providence, construct a non-condensing horizontal engine, which is worked by Corliss's peculiar valve gear. These valves are segmental in form, and in their movement rotative-reciprocating. The steam passages, four in number, are reduced to the shortest practicable length, and each is controlled by a separate valve. The steam is employed expansively, the point of cutting off being controlled and regulated (without appreciable resistance) by the governor, so as to proportion the total pressure of the stroke continually to the desired rate of movement of the machinery; while a peculiarity of the action of the valves is the complete and almost instantaneous manner in which they open and close the passages, thus admitting the steam at or near the full boiler pressure, and preventing the effect known as "wire-drawing." Some of these engines have recently been furnished to orders from Scotland, the centre of steam engine manufacture. Non-condensing stationary engines are direct-acting, and have two principal plans of construction, the horizontal and the vertical. Of these the former are most common. The oblong form of base is now mainly superseded by a base in L form, of which the chief strength is in a vertical web; and the cylinder, crank, and fly-wheel are so attached to this that the strains arising in working the engine are best met, and the relative positions of the parts the most accurately preserved. Pumping engines are of various construction; among them the most noted and efficient are the so called Cornish engines. These engines economize the power they produce by dispensing with cranks, the fly-wheel, and many other parts to which ordinary forms of engine must impart movement; while for facility of admitting steam of very high pressure, for the great ratio of expansive working they allow, and the small amount of friction involved, they have for pumping taken precedence of all others. For Worthington's "duplex engine," for pumping, see Pump. IV. *Behavior of Steam in the Engine, and how known.* The substitution of the elastic force of a vapor for the practically limited and unvarying pressure of the atmosphere, introduced a source of power susceptible of indefinite increase, and restricted only by considerations of safety and of practical advantage. The question, within what limits of steam pressure the maximum of advantage is to be attained, is however one involving so many variable quantities, dependent on the construction of the engine and the conditions under which it is worked, that no general determination of this problem has been obtained; and the desired information must be arrived at, if at all, by repeated experiments for each sort of engine and each set of conditions under which it may be worked. The tendency of such experiments has been to show a gain from the use of comparatively high pressures; so that, in condensing engines, the working pressure (in excess over one atmosphere) per square inch on the piston has been carried up from about 8 or 12 to an average of 25 or 30 lbs. Steam, as commonly employed, is drawn directly from the boiler, and generally in the boiler is saturated, or at maximum density. So existing, the slightest fall of the temperature, owing to abstraction of heat by the surfaces of the cylinder, by radiation, or otherwise, unavoidably determines the condensation of a portion of the steam. It is this instantaneous sensitiveness to cold and facility of condensation that most frequently prevent our attaining the working power of which theoretically the boiler pressure and the engine should be capable, and that oftenest defeat the special expedients resorted to for increasing their efficiency. When steam first enters the cylinder, the space it exists in is at once enlarged by that through which the piston moves; and if the steam space in the boiler and the heat for generating fresh supplies did not much exceed the capacity of the cylinder, the consequence would be a rapid reduction of density and pressure of the acting body of steam. With adequate boiler and furnace, however, the steam removed into the cylinder is continually replaced; and if the pressure be at first somewhat above that of the air, and the steam pipe kept open, the initial pressure of the entering steam may be regarded as, so far as this cause is concerned, maintained from beginning to end of each stroke of the piston. The disturbances in the actual pressure spring mainly from other sources. Even though it were uniform, the pressure on the piston is not equal to that in the boiler; a result due to length and winding of passages, to friction, with usually some condensation. Upon the piston the steam works in a twofold manner: first, by the tension it possesses as delivered freely and continuously into the cylinder; secondly, after the supply is cut off, by the expansion of the volume previously delivered, until in so expanding its pressure may fall to and be balanced by that of the atmosphere, or by the back pressure of the exhaust steam on the other side of the piston. Actuated in the former manner through the entire stroke, the piston should advance under a uniform impulsion, its speed being constantly accelerated, and its momentum at last suddenly expended on some fixed parts of the machine, involving injury to the latter, and waste of power; when the latter method is, at the proper point in the stroke, made to supersede the former, the pressure gradually falling may be caused to approximate so nearly to, or to fall so slightly below, the back pressure, that the impulsion of the piston and its velocity shall gradually decline, and terminate naturally at or near the end of the stroke. So much cutting off and expansive working of steam is practically desirable in all engines; but this is not what is technically intended by "cutting off" and "expansion." In the mode of working specially so named, the steam being of comparatively high tension, the supply to the cylinder is cut off at an earlier period in the stroke; and expansion is availed of, not merely for avoiding waste, but as a positive means of deriving from a given volume of steam an augmented total of pressure, and so of performance. In strict language, the whole process is expansive acting; since so long as its pressure is in excess of that of the bodies that confine it, the steam must continue to push these bodies before it, in the tendency to arrive at equilibrium; and, with open ports, its expansive energy acts from the water in the boiler as its fixed point or fulcrum, as, after cutting off, it acts from the fixed end of the cylinder. For practical purposes, however, the distinction to be drawn at the point between full and expansive working is a real and important one. In actual working, again, the pressure of full stroke is seldom or never maintained quite uniform; owing to time consumed in shutting the ports, or to great speed of the piston, or to both, the density of the steam is reduced, and the pressure begins to decline before cutting off is complete; if this result is marked, "wire-drawing" of the steam is said to occur, the effect being as if the entering charge were gradually drawn or spun into steam of reduced density and pressure. In order that the steam may gain admission within the cylinder by the very moment at which the stroke should commence, the valve motion—the eccentric on the shaft, for example—must be so set in advance of the crank that the steam port shall be already uncovered or opened by a small fraction of the movement of the valve by the time the piston is prepared to return. This anticipative opening of the steam port is called the lead; and it may be greater or less, even to commencing the steam supply in front of the piston while nearing the end of its stroke, for the purpose of "cushioning" it, *i. e.*, arresting its movement against the steam itself, as against a spring; the point of effecting this being simply determined by the adjustment of the valve gear, with the form and dimensions of the valves. Properly, one complete advance and return of the piston constitutes a stroke; the respective half strokes, however, being termed forward stroke and return stroke. Let us trace the distribution of the steam during a stroke starting from either end of the cylinder. Suppose the piston, fig. 4, to have risen already to its highest position in the cylinder; now, in obedience to the position and throw of the eccentric, or to a connection with the governor, three events have just previously occurred: the returning valve has closed the exhaust from before or above the piston, locking up before it a residue of steam; it has at the same moment, or a little before, opened the exhaust beneath the piston, relieving it of the pressure that impelled it forward; and very shortly after these two events it has opened the steam communication above the piston by the amount of lead allowed, and commenced the steam supply. Under this last, having come to rest, the piston commences its forward stroke; the exhaust from before (beneath) it, having been previously opened, is maintained during nearly this whole movement; but first, and at the proper fraction of the movement, the steam supply behind (above) the piston is cut off. Shortly before completion of this forward stroke the exhaust in advance of it is closed, and that from behind it opened; and at a very small distance from the end the lead or admission of steam from beneath occurs, and in a moment more the arrested piston is ready for the return stroke. Thus, on the two sides of the piston there are at the same time proceeding two complete cycles of events, but in different parts of their course. In each cycle there are these four events, in their order: 1, admission of steam; 2, suppression or cutting off; 3, release, or exhaust; 4, arrest, or lock-up, prior to readmission of steam.—The pressure, and generally the behavior of the steam during a stroke in either end of the cylinder, is known by use of the indicator. This, in a usual form, fig. 6, is a long, small cylinder, having within it a piston, which is fixed to the lower end of a spiral spring that attaches above and within to the top of the cylinder, and which, moving with little friction and carrying outside the cylinder case an index, is made by this to show and also to register the pressures of steam exerted upon it; thus it can indicate for any steam space the work the steam in it is capable of, or is performing. C is the cylinder; *s* a tube with screw thread for fitting into an orifice in the cylinder cover, or in any passage, or the boiler, as may be desired; *c* the cock

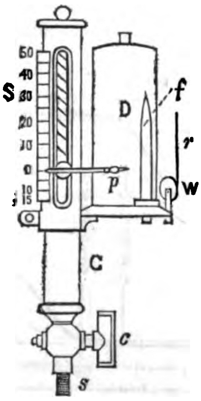

Fig. 6.

opening or closing the tube. The index, *p*, fixed to the piston, rises and descends with it, one of its ends moving along a scale, S, showing the pressure in pounds per square inch on the piston; the other end having a joint by which a pencil is brought down in contact with a sheet of paper called the card, rolled about a vertical drum, D, and held upon it by clasps, as *f*. The spring is of such length that when the atmosphere entering above rests upon the piston, and steam of one atmosphere balances it from beneath, the piston shall rest in its natural or unstrained position; this point is the 0 of the scale. If the steam pressure exceed one atmosphere, it forces up the piston and index, compressing the spring; if it fall short, the piston and index are by the air carried proportionally down, elongating the spring. The drum can rotate about half way around a vertical axis, and when released is returned with a like uniform movement by a spring within. By the wheel, W, and cord, *r*, the connection needed to work the drum is made with some part of the machinery. To use the indicator: Connect it with the interior of the cylinder or other steam space; leave the cock open during a few strokes of the engine piston, to bring the indicator cylinder to a like temperature; and the pressures upon the indicator piston and, say, the engine piston may now be considered equal. Now, at beginning of a stroke, bring down the pencil to touch the card; the latter semi-rotating and returning, and the pencil rising and falling with the varying pressures through the stroke, there is traced on the card a curved figure, approaching more or less to an oblong, which is the "indicator diagram." Closing the cock at beginning of the next stroke, let the drum turn once or more while the pencil rests stationary; thus will be traced through or beneath the diagram, as the case may be, at the 0 level, the "atmospheric line." The lengths of ordinates drawn from this line to points of the curve above it will show the excess above one atmosphere of the steam pressure, and to points below the line the degree of exhaustion, for parts of the stroke corresponding to those points. Of course, with high pressure engines the diagram will never run below the atmospheric line. In fig. 7 are shown two diagrams, the heavy-lined and dotted-lined figures, taken from a locomotive engine, under different conditions. A B, the atmospheric line, may also represent the length of stroke; the periods of the several events in the distribution of steam are here noted for comparison. The diagram is a picture of the operations in one end of the cylinder; and the indicator has been aptly said, like the stethoscope, to reveal what is transpiring beyond the reach of the eye. When accuracy is desired, diagrams are taken for both ends of a cylinder. A B, fig. 7, may stand for the length of stroke, and the space above this line represent the interior of the cylinder. In the heavy-lined diagram, taken with the slow average speed of piston, 40 feet per minute, the piston is seen here to start under the uniform pressure of 61 lbs. above the atmosphere; to preserve this nearly until cutting off of steam; the pressure during expansion then rapidly declining to about 28 lbs.; on release, still more rapidly; and before the end of stroke to come down completely to one atmosphere. During the return stroke, the back pressure remains thus low, until, upon lock-up, the pressure curve mounts rapidly; and at *a*, when the "lead" takes place, it sweeps still more rapidly up, regaining the full head by beginning of the next forward stroke. Here, with admission through about ¼ the forward stroke, and expansion through slightly more, inspection will show that about ½ the whole work of the steam has been that secured by expansion. The dotted-lined diagram shows the behavior of the steam in the same cylinder, with speed of piston equal to 310 feet per minute, other conditions remaining the same. Here, the steam entering at initial pressure of 62 lbs., the quick recedence of the piston before it allows the pressure curve to fall slightly; from wire-drawing near cutting off, it falls still more rapidly; after release, however, keeping higher than before, since the speed of the piston does not allow time for exhaustion; and at no time in the return stroke quite falling to 0. If, when a slide valve is in middle position, the advancing edge on whichever side already overlaps the port on that side, it must have closed that port previous to its reaching such position, *i. e.*, to cut off earlier than in full working, and to work the steam expansively. The effect, the opposite of "lead," is called the "lap;" and the amount of the lap determines the ratio in which expansion shall occur. If the cylinder be colder than the admitted steam, a very sensible condensation occurs, both during admission and the early part of the expansion; and though during the latter part

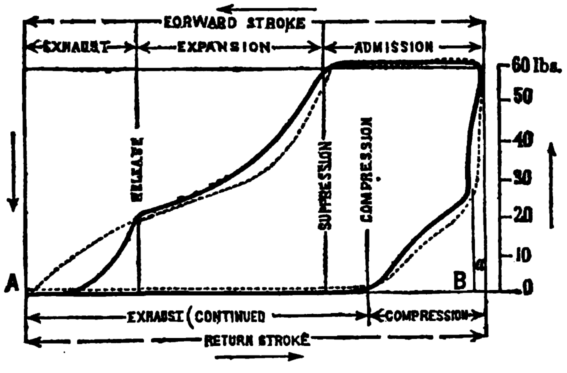

FIG. 7.

of the expansion the remaining steam, becoming more tenuous and dry, re-absorbs part of this water due to condensation, yet there is an absolute and considerable loss, which increases as the steam is earlier cut off. In ordinary engines the waste due to this cause has been found often to exceed 12 per cent.; in exposed locomotive engines, to amount sometimes to nearly 40 per cent. And it is doubtless this source of loss, where the steam is not at all superheated and the heat of the cylinder not kept in, that often defeats attempts at expansive working of steam, and leads to a prejudice against the method, when the fault is in the unfitness of the conditions under which it is tried. No doubt one of the chief actual benefits of superheating steam through a few degrees, before admission to the cylinder, arises from its thus being supplied with a surplus of heat, by parting with a portion of which it keeps up the temperature of the cylinder, while another portion serves to prevent condensation or speedily to re-convert into steam the water due to its momentary occurrence. Back pressure in condensing engines is in part due to air liberated from the boiler water; but, on the principle that the pressure in communicating vessels is never less than that in the coldest part, it is chiefly that of the vapor in the condenser, its temperature being about 104° F., and its pressure 1.06 lbs. per square inch; in practice, the total back pressure is 1 to 3 lbs. or more. Back pressure is made less by enlarging the exhaust port. As to the measurement of the work of the engine: the indicator diagram represents, for each given point in the advance and return of the piston, the effective steam pressure or the back pressure exerted per square inch on the corresponding face of the piston. As the lines of the diagram are curved, its area must be found by a process of reduction or average. Divide the diagram into horizontal sections answering to the pressures, and into a convenient number of vertical sections, as shown in fig. 3; take the mean effective pressure in each of the vertical sections, add these together, divide by the number of such divisions, and the quotient is the effective mean pressure per unit of surface for the whole diagram; multiply this by the area of the piston in like units, and the product is the whole effective work upon one surface of the piston for one stroke. Proceed in the same way with a diagram for the other end of the cylinder; add the two results; take their mean; multiply by the number of single or half strokes of the engine per minute, and divide by 33,000 (see MECHANICS); the resulting quotient is the "indicator horse power" of the engine. In averaging the diagram, fig. 3, add the average pressures for the 10 divisions made in the stroke; their sum, 204.5, divided by 10, gives 20.45 lbs., the mean unbalanced pressure per square inch on the piston throughout the stroke. If there be two or more engines acting together, the total indicator power must be found by adding the results given by the cylinders separately. This is the work upon the piston, under the total of resistances of every kind that must be overcome during, and to allow of, its movements; but to find what part of this work is expended upon the useful resistance overcome, or at any other connection between the piston and the useful resistance, so as to learn how much of the retardation of the piston is due to the machinery, or possibly to imperfections in it, it becomes necessary to interpose some form of dynamometer at the connection where the observation is to be made, so as to find by its indications how much of the total work upon the piston during a given time reaches and is expended at that connection. "Nominal horse power" is a conventional unit of size of cylinder, not of observed power of the engine. The rules of estimating it have differed with different localities, and they have usually allowed a larger unit of capacity for condensing engines. It is not much in use as a measure of value of engines in the United States; when it is so, the following is a usual form: H. P. $= \dfrac{\sqrt[3]{\text{stroke in feet}} \times \text{diameter}^2 \text{ in inches}}{47}$. Actual horse power should be reckoned in actual units of pressure, to be known either by use of the indicator, or of a dynamometer showing the power delivered at the crank shaft. For the former, the rule may have the following expressions: Ind. H. P. =

$$\frac{\text{mean press.} \times \text{diam.}^2 \times .7854 \times \text{stroke} \times 2 \times \text{No. of turns}}{33{,}000},$$

$$= \frac{\text{pressure} \times \text{diam.}^2 \times \text{stroke} \times \text{No. of turns}}{21{,}000},$$

$$= \frac{\text{pressure} \times \text{area} \times \text{stroke} \times 2 \times \text{No. of turns}}{33{,}000}.$$

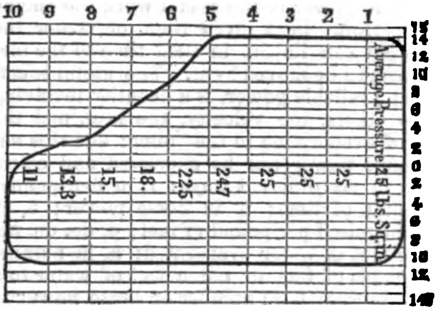

FIG. 3.

V. *Work of Steam in the Engine.* The pressure of steam in the boiler, and within the steam chest or the cylinder, is commonly brought under direct observation by means of pressure gauges of various sorts (see PNEUMATICS), while the degree of vacuum in the condenser is indicated by the vacuum gauge. What is at different times called the "vacuum" of the condenser may be either the degree of actual vacuum produced, or the residual pressure. Thus, when the latter sustains 5 inches of mercury, it may be said in one sense that a vacuum equivalent to 25 inches of mercury is obtained; in another and less correct sense, that the vacuum corresponds to 5 inches of mercury. In double-acting condensing engines, the piston is released from effect of the external atmosphere, and its work is performed and estimated independently of it. The indicated power of every steam engine is greater than the available power by the amount of energy expended in overcoming the resistance of the engine. The available power is the useful work the engine can perform in a given time, or rather the power it can impart in such time to the mechanism to be moved by it. The useful effect, or net available power, is a quantity involving three others, the velocity, the load, and the rate of evaporation in the boiler; and this net available power can be expressed and calculated in six different ways: 1, in foot-pounds per unit of time; 2, in horse power; 3, in weight raised per pound of fuel; 4, do. do. per cubic foot of water evaporated; 5, in number of pounds of fuel, or cubic feet of water to a horse power; 6, in number of horse power to a pound of fuel or a cubic foot of water. For the investigations by which formulas for these calculations are obtained, and for the modes of obtaining the requisite numerical solutions by them, the reader is referred to the more comprehensive works presenting the mathematical theory of the steam engine, especially to those of De Pambour, Tredgold, Bourne, and Rankine. The limit beyond which expansion cannot be advantageously carried seems to be that number of volumes found by dividing the initial pressure of the steam by the pressure in the condenser. This result of theory, however, proceeds on the supposition that the steam is maintained in the perfectly gaseous condition. Practical results seem to sustain Prof. Rankine's estimate, to the effect that the gain of efficiency in an ordinary engine, cutting off at one fifth, with superheating by heat from the flues steam of 34 lbs. pressure, is about 15 per cent.; if by heat otherwise wasted, as by carrying the steam pipe through the chimney, about 23 per cent. Though the principle of working steam expansively is very simple, and has long been accepted, the subject is not yet exempt from discussion or differences of opinion among engineers. Mr. King, in his "Practical Notes on Steam" (New York, 1861), estimates that by cutting off at half stroke the saving in fuel may be made nearly 20 per cent.; and for other ratios of expansion, within certain limits, in proportion. Engineers Isherwood, Stimers, and others, as the result of numerous and it would appear carefully conducted experiments with the engines of the steamer Michigan, at Erie, Penn., were led to conclude that the maximum gain by expansion is secured by cutting off at $\frac{7}{10}$ stroke; that to cut off much short of this affords no gain; that the loss by condensation in the cylinder, and by increased friction and back pressure, is generally underrated; and that the use of a variable cut-off has usually not sufficient advantage over the ordinary throttle-valve, to compensate for its cost and the attention it may require. It may be considered doubtful whether these conclusions will be fully sustained; but they will at least have the good effect to call attention to the extreme to which expansive working has been carried, steam having been cut off in some cases at $\frac{1}{32}$, or even $\frac{1}{64}$ of the stroke. The ideal "cut-off" arrangement would be that which, first, should close the ports instantaneously at the proper moments, so that the steam should be admitted unreduced by wire-drawing, and enabled to act as it were with explosive force upon the piston; and secondly, which should be completely under control of the governor. The cut-offs now in use are very numerous, among them those of Sickels, Stevens, Allen and Wells, Corliss, Woodruff and Beach, and others. In respect to superheating of steam within limits from 10° to 40° above the temperature of saturation, it may be proper to add that the fears once entertained of its destroying lubrication, burning the surface of the cylinder or passages, &c., have proved quite groundless in practice; while at the same time, the notion that high superheating would greatly increase the effective work of the steam has also been discarded; so that superheating within moderate limits is now resorted to, mainly as a desirable condition for successful expansive working, or otherwise, merely as a means of preventing loss of the steam pressure. In practice, indeed, owing to want of heat conduction in fluids, with radiation of heat into the dome from the water surface, or from other causes, the steam in a high dome, and especially when the water beneath is for some time but slightly agitated, is in effect isolated from the water, and actually very often becomes superheated, unknown to the engineer. In some marine engines, also, steam is in practice surcharged with heat in the dome, by carrying flues through or around it. It is customary to estimate the efficiency of steam in a rough way by considering the effective mechanical force of a cubic foot of water vaporized as 60 horse power. If, then, this quantity of water be converted into steam in an hour, it will give a horse power per hour; and the boiler and engine that could generate and employ the steam of 10 cubic feet of water per hour, would give continually 10 horse power of work upon the piston. The high boiling point of water, but more especially the large degree of latent heat required to vaporize it, renders steam power expensive through necessity of a proportionately great consumption of fuel. Accordingly, various other vapors, as well as gases generated by explosion, have been tried as substitutes for steam. A comparison of the boiling points and latent heat of certain other liquids, with the relative volume and density (air being 1) of their vapors, will show theoretically their eligibility thus to serve as more economical substitutes:

1 cubic foot of	Boiling point.	Latent heat.	Relative volume.	Density.
Water	212°	965.2°	1,642	.624
Alcohol	173°	425.0°	660	1.614
Ether (sulphuric)	97°	302.0°	443	2.586
Bi-sulphuret of carbon	116°	144.0°(?)	315	2.645
Oil of turpentine	314°	133.0°	193	5.013
Chloroform	142°	....	....	4.199

For accurate estimates, the specific heats must also be regarded; these by latest results are, for the vapors named in order, .305, .451, .481, .157, .506, and .156, that of an equal weight of water being 1. Thus far, however, engines driven by vapors other than steam, and also compound-vapor engines, have proved too expensive through waste of the material, and have not attained to a decided success. For the application of hot air as a motor, see Atmospheric Engine. VI. *The Production of Steam.* The capacity and principle of construction of the boiler or generator of steam must be determined generally with a view to the strength of the materials and the laws of combustion and of heat, and especially with reference to the specific purpose for which the engine is intended. In boilers for marine or locomotive purposes, rapid generation, security, lightness, and compactness should be attained, and if needs be at the cost of some waste of fuel; in those for stationary engines economy is the paramount object. Boilers before the time of Watt were usually in shape of an inverted frustum of a cone, with a hemispherical top and slightly concave bottom, and were set in an arch of brick-work, the fire being admitted to the bottom only, or also about the sides. To make a boiler stronger for its capacity and with greater heating surface, Watt introduced the long rectangular form, with semi-cylindrical top, the ends flat, the bottom and sides slightly concave, and set in a long arch; this was called the wagon boiler. The next transition was to the cylindrical boiler with hemispherical ends, as giving greater strength and heating surface. Subsequently a single straight flue, a single flue bent and returning, or two or more flues, were carried through the interior of the boiler; and the fire being made directly in these, or the heated air of the furnace being made to circulate through them while the water surrounded the flues, a much increased utilization of the heat of combustion was the result. From boilers with flues to those traversed by a large number of small tubes, in which the flame and heated air directly from the furnace shall circulate on its way to the chimney, thus exposing to the fire a maximum of water surface, the transition was a natural one; this form, known as the multitubular or tubular, is best illustrated in the locomotive boiler. The name tubular boiler is more correctly given to those boilers in which the tubes contain water, being surrounded by the flame. Flue and tubular boilers are those now most generally in use; they are either horizontal or upright. For a description of Messrs. Lee and Larned's annular boiler, see Fire Engine. The shell of the boiler, which may have a great variety of forms, is the general or outer wall, enclosing a space, part of which, as occupied by water, is the "water room," and the portion above this the "steam room." The furnace is the chamber which receives the fuel; when within the shell, this is called the fire box. The grate or fire grate is that part of the bottom of the furnace on which lies the fuel; it is constructed of "fire bars" or "grate bars," with spaces for admission of air. The part consisting of a plate, without such openings, is the "dead plate." The chimney affords draught and conveys away the final products of combustion; the flues or tubes for flame sometimes open into a chamber at its lower part, called the smoke box or uptake. The chimney, flues, or tubes may be controlled by dampers. The "tube plates" receive and are pierced by the ends of the tubes; they form either part of the shell, or one side of an internal fire box. The steam chest or dome, upon the upper side of the boiler, is the reservoir for the generated steam, which, as the various valves may allow, is supplied from it to the cylinder; or when its pressure exceeds the load upon the safety valve, directly escapes through this into the air. The height of water in the boiler is known by the water gauge, usually a strong glass tube standing outside the boiler; or by use of "try-cocks," three or more at different heights upon the boiler, and opened by hand. A pressure gauge shows the pressure within the boiler. A vacuum valve is a safety valve opening inward, to prevent collapse when the pressure within falls below that of the atmosphere. "Mud holes," at or near the bottom, are for the discharge, when needful, of collections of sediment; but it is very important, especially in marine boilers where sea water is used, to prevent such collections; and for this purpose sediment collectors, and various means for prevention of incrustation by previously precipitating the saline matters from the water, are employed. The apparatus for feeding the boiler with water, especially when the engine is at rest, may require to be driven by a separate and smaller engine; this is then called the "donkey engine." Feed-water heating, previously to admission of the supply to the boiler, may be accomplished in various ways; among them by carrying the water pipe through or about the flues or chimney. Brine pumps may be used for clearing the boiler of brine or sediment, or a large blow-off cock through the bottom of the boiler. Scum is removed by a scum cock or surface-blow at the surface of the water. The importance of keeping the water in the boiler always as near as possible to a certain height, so as to prevent liabilities on the one hand of priming, and on the other of burning or melting its sides or flues, or of explosion, will be very obvious; and a variety of devices, some of them already named, have been applied in order to aid and direct the engineer in this respect. Among the most recent, and perhaps for safety the most valuable of such devices, are those known as "steam alarms," which are automatic, being caused to open a safety valve and blow a whistle or ring a bell when the water falls below a given level in the boiler. (See further, BOILING POINT, COMBUSTION, EVAPORATION, and FUEL.) The questions of the efficiency of steam boilers, the due proportioning of the fire grate, the flues, the heating surface, &c., to the capacity of the boiler and of the engine, and the duty of engines, are among those of great interest in the practical and commercial aspects of the subject, but for which space can only be allowed in the larger and specific treatises. It may be stated that in large land engines it is customary to allow for each horse power of pressure about 1 square foot of fire surface, 3 cubic feet of furnace room, 10 cubic feet of water, and 10 cubic feet of steam room. To vaporize the water, it is found in England, where coal is more cheaply obtained, and economy in its use not so much an object, that from 10 down to 8 or 7 lbs. of coal per cubic foot of water are consumed; in this country, in cases of good performance, the like effect is often obtained with about 6 lbs. of anthracite coal. VII. *Steam Boiler Explosions.* These accidents are of different sorts; sometimes the metal is simply rent, steam or water or both escaping; sometimes the boiler or a flue is burst inward, a result known as "collapse;" but in explosions proper, the boiler is not only ruptured and often thrown from its place, but fragments of it are usually hurled with terrible force from the spot, accompanied with escape of steam and scalding water. Of certain peculiar theories proposed to account for explosions, one, to the effect that they are due to an electrical charge within the boiler, has no support whatever in facts, and is wholly visionary; a second, assigning as the cause the occurrence of an explosive mixture of gases within the boiler—hydrogen and oxygen being the only possible gases, and their presence in the needful quantities in any case being extremely questionable—is probably not less so. A recent projectile theory of explosions appears to add nothing to our knowledge of the accident; for though projection of the steam and water does occur, it is the effect of the steam pressure, and allowed by relative weakness of the boiler. M. Jobard (1861) has, however, shown that many explosions of stationary boilers are owing first of all to explosive combination of a sort of fire-damp of hydrogen and air, collecting in the chimney or flues during rest of the engine, and ignited on subsequently disturbing the fires, without previous opening of the dampers; the first effect is to throw the boiler out of place, and the flow of the water within it over its upper heated surfaces generates a pressure that next rends the boiler itself. Other causes or conditions which doubtless often lead really to explosions are the following: 1, in a boiler very highly heated, and without fresh feeding for some time, the body of water may assume the spheroidal condition (see EVAPORATION), and a film of vapor lying between it and the metal, the latter can become unusually heated; on feeding cooler water or disturbing the fires, contact with the metal may be renewed, with sudden generation of steam of extremely high pressure; 2, by long boiling, without renewal, the water may become so far freed of air or other permanent gases that serve to form openings within its mass into which vaporization can begin, that its boiling point shall be raised, and when reached, a considerable body of the water, as has been observed in the experiments of Donny and others, shall burst suddenly into steam; 3, superheating may have taken place unsuspected within the dome, and when by fresh feed or rousing the fires the equilibrium within the boiler is disturbed, water being dashed up into the body of superheated steam, or otherwise, the sudden transfer of heat to the generation of saturated steam may instantly and very greatly increase the pressure. The last named cause could occur at any time during the running of an engine, if the steam became superheated and the boiling afterward more tumultuous; and any of these three causes can readily be supposed to occasion some of the explosions of stationary and steamboat boilers, known so often to occur upon first disturbing the water or fire after a period of rest of the engine. In all three of them, moreover, the production of an enormously great steam pressure may be almost instantaneous; so that the well known principle of blow or shock would come into play, the tenacity of the boiler giving way under the suddenness of the impulsion, before the limit of strength of the metal had been reached. Whatever be the occasion of explosions proper, however, their immediate cause is always the same—a momentary excess of the pressure of steam within the boiler over the strength of some of its parts. In the best arranged modern boilers, there are 2 or 3 safety valves, at least one of which is placed within the boiler, or otherwise beyond the control of the engineer. An advantage of tubular and small-flue boilers is the circulation of the water maintained in them, which retards or prevents formation of scale. Another, with water tubes, is the greatly increased strength to be had even with less thickness of material, owing to the relatively small diameter of the tubes; and further, since the same tube resists rupture from within up to pressures exceeding those that would cause flattening or collapse from without, it follows that, with like size and thickness of tubes, water-tube are stronger and safer than flue-tube boilers. The common impression respecting the greater danger of high pressure than of low pressure boilers, requires some qualification. In itself, and in one way, the high pressure is a source of increased risk; but the boilers generating such steam usually admit of being much smaller, and from this circumstance are relatively stronger; beside, they contain (locomotive boilers excepted) a less body of water and of steam to be projected about them in case of explosion. Low pressure boilers, on the other hand, have in them, when working, a large body of steam and also of water; when explosion occurs, this water being suddenly released from the confining pressure, much of the excess above 212° of heat in both the steam and water instantly goes to the generation of a greatly enlarged volume of steam; and this large body of scalding steam and water is projected through a more considerable space about the place of the boiler. Thus, the actual destructiveness and fatality consequent on explosion of the low pressure boiler are likely to be the greater, to say nothing of the fact that, from some of the peculiar conditions named above, even the projectile force given to the fragments and contents of the latter can be, in certain instances, quite as great as with the former. Obviously, most if not all the occasions of boiler explosions are avoidable, through, 1, avoiding the forcing of the fires; 2, keeping the valves in proper condition, and in no case over-weighting them; 3, supplying the feed water regularly, constantly, and in sufficient quantity; 4, in case the plates are discovered, or where they are likely, to be over-heated, abstaining from the sudden introduction of feed water, drawing or extinguishing the fires, and blowing off the steam and water.—**Steam Carriage.** For information respecting the invention and early improvement of the locomotive engine, see Railroad, and incidentally Evans, Stephenson, and Stevens. The locomotive engine has so few points of resemblance to any other as to be essentially a new application of the same moving power. The use of steam at very high pressure and with rapid travel of piston, allows of a comparatively diminutive cylinder; while the high steam and great speed sought require a very large boiler and intense fire, to generate such steam with due rapidity. Intended, as its name imports, for locomotion, this engine must carry with it the water and fuel necessary to its action; and being subjected to violent strains and shocks, it should, along with the requisite conditions for furnishing the power, embody great strength and compactness of construction; to secure the latter, the engine and boiler are mounted together upon one carriage, through the wheels of which the tractive power is to be applied. Evans and others had placed the boiler and engine on one set of wheels; Trevithick and Vivian (1802–'3) separated the traction carriage, or locomotive proper, from those intended to receive the load; and they first discharged the exhaust steam from the cylinder into the chimney, to create draught. George Stephenson, about 1825, applied this principle much more successfully, perhaps reinventing it, and to him it is usually assigned. Seguin in France, and Booth in England, in 1829, furnished the multitubular flue boiler; the efficient adhesion of smooth driving wheels had before been discovered; and Stephenson's combination of all these essentials, with his direct connection of the piston rods, one on each side, with the propelling wheels, resulted in the first really successful locomotive, the Rocket, in the renowned "railway year," 1829. Timothy Hackworth contributed, before 1830, the six coupled wheels and the steam chamber over the boiler, placed the cylinders under the boiler, and made other improvements. The size and weight of the locomotive have been since that time much increased, and a construction highly perfected in detail and well adapted to the purposes desired has been attained. Modern English passenger locomotives are of two general types: 1, the "inside cylinder" locomotive, having the cylinders within the framing, under the boiler, with a main driving axle cranked at two points to receive the action of the piston rods; 2, "outside cylinder" locomotives, having the cylinders external to the framing, the axles straight, and the piston rods attaching each to a crank pin fixed between spokes of a driving wheel, the pin turning with the wheel about its axle, and serving as the engine crank. English freight or "goods" locomotives are also of two classes: 1, those with 6 wheels of like size, the 3 on either side having their crank pins coupled by horizontal bars called parallel rods, which secure the same crank action upon and movement of all the wheels; 2, those having the fore wheels smaller, the two back pairs only being of like size and coupled. The power of a locomotive, other things being equal, will depend on the amount of the steam pressure upon the piston; but a condition favoring is found also in the use of small driving wheels. As each revolution of the wheel to which the piston rod is attached must correspond to one stroke of the piston, it follows that speed of travel will depend on the speed of the piston, or number of strokes it can make per minute, but that it is also favored by use of large driving wheels. After many fluctuations, American practice has recently tended to the adoption of wheels of somewhat less diameter than those used a few years since. American locomotives are almost invariably outside-connected, *i. e.*, have their cylinders outside the truck or engine frame, as well as nearly or quite on a level with the axles of the driving wheels. There are but two general types of construction, those for passenger and for freight trains. The former have 8 wheels, 4 in front set in a movable frame, the bogie or truck, turning on a central pivot to allow of running on curves in the road, and 4 larger ones behind, the drivers, or driving wheels, of equal size, and coupled with parallel rods. The freight locomotives are on 10 wheels, the leading 4 in a swivelling truck, and the 6 back wheels, 3 on a side, coupled as drivers. American locomotives are distinguished also by the cab or house at the back end to protect the engineer and fireman, with glazed opening in front to afford a view ahead, and by the larger size and form of the chimney or smoke stack, a cylinder of wire net within an inverted cone, with wire net and baffle-plate above to deflect sparks into the intervening space—an arrangement specially adapted to the use of wood as fuel, and called the spark-arrester. Between the cab and the chimney of a locomotive appear, also above the boiler, the smaller dome in front surmounted with the steam whistle, the bell, and the dome proper. The "cow-catcher" or the snow plough may be attached forward, for the purpose of clearing the track; and in front of the chimney is also affixed a lamp with a parabolic reflector, for lighting the track in advance at night. The "tender," which conveys water and fuel, is a smaller carriage next the locomotive, and on 4, 6, or 8 wheels, arranged in two trucks, to facilitate turning. Its back and sides are occupied by the water tank, in horse-shoe form, holding from 800 to 1,000 gallons of water, while in the hollow of this is stowed the fuel, both being intended for some 15 to 30 or more miles run. The water tank communicates through pipes, connected by flexible hosing with two small lift-and-force pumps, worked from the piston rod, and the delivery of which can be regulated so as to feed continuously or at intervals. From the upper part of the dome the steam pipe opens out, descending and running forward within the upper part of the boiler, thence emerging within the chimney, where it divides into two branches, that run down and open each into the valve chest of one of the cylinders, each chest lying at the inner side of its cylinder. Sometimes the dome and commencement of the steam pipe are at the forward end of the boiler. In any case, while working, the chests are kept filled with steam which surrounds the valve—a single slide valve moved by one or two eccentrics and rods from the driving axle—and the steam is thus continually in readiness to flow into either port when uncovered, and to act upon that side of the piston corresponding. (See STEAM ENGINE, II.) The steam pipe may have in it a throttle-valve, under control of the engineer, through a lever handle and links. Thus the governor is rendered unnecessary, as it is also inapplicable. From length of passages, smallness of apertures, failure of the boiler to keep up the supply, or other causes, the pressure the steam can exert at and on the piston is always less than that it has within the boiler; and the necessity and mode of obtaining draught still further deduct from the effective pressure. The double-cased sides of the fire box, a space of 2½ to 4 inches within which, directly about the fire, is filled with water, and the small flue tubes traversing the cylindrical portion of the boiler, conveying flame and hot air toward the chimney, and surrounded with water, can generate steam rapidly and of very high pressure. But to this end, the fire must burn briskly, and the heated gases escape rapidly through the flue tubes, 100 to 200 or more in number, to the chimney. To secure the required draught through these, the exhaust pipe from each valve chest is carried directly into the chimney, and the two are united in a pipe called the blast pipe, which opens at a little height by a contracted mouth. The forcible and rapidly recurring puffs of the waste steam discharged from the cylinders out of this pipe into the chimney, carry with them the surrounding body of air, and create a partial vacuum, which can be supplied only by the consequent rush of fresh air through the grate, the fire, and the flues. Now, the contraction of the blast pipe needful to secure blast unavoidably keeps back somewhat the exhaust steam, and so results in a continued back pressure against the piston, while advancing either way under the last admitted steam charge; and when the speed of the locomotive, and so of the piston, becomes very great, this back pressure is correspondingly increased and rendered well nigh continuous. To accomplish successfully by use of the slide valve the required distribution of steam in the cylinders (see STEAM ENGINE, IV.) has been perhaps the most difficult problem in locomotive construction, and the one on which the greatest amount of ingenuity has been expended.. In the case of a question so highly mathematical and technical as this, nothing beyond an intimation of the objects sought and of the means employed to attain them can be presented; the reader will find the subject fully discussed in Mr. D. K. Clark's "Railway Machinery" (Glasgow and London, 1855). First, the valve should be so moved as to admit and discharge steam when the piston is at or near the beginning or end of the half strokes; secondly, the valve gear should render a variable expansion, or ratio of cutting off, practicable; and thirdly, the valve gear must be capable of reversing at will the action on the piston, so as to reverse the movement of the engine and carriage. Remembering that the diameter of the crank circle equals the length of stroke of the piston; that when the crank pin and piston rod are in the horizontal diameter of the crank circle the piston is at beginning or end of stroke; that when the crank pin is in the vertical positions the piston is about midway in either half stroke; and that in a general way admission and exhaust should begin to occur about the times when the piston begins or ends a half stroke; it will be seen that, to accomplish the first purpose, the valve should begin to open either port to steam and the other to exhaust about the time when the crank pin and rod are in the horizontal positions. Now, remembering further that an eccentric turning on an axle is essentially itself a crank, the distance of the centre of its form from the centre of motion being the length of crank, and double this distance being the diameter of this crank circle, and also the length of the throw the revolution of the eccentric will impart to its rod; that the valve moving either way from its middle position will be just beginning to uncover the ports; and that it will be in such position when the centre of form of the eccentric is in the vertical positions in respect to the axle, it will be seen that, with a single eccentric and rod, the first object is attained by setting the eccentric so that its radius shall be "quartering" or at right angles with the line of the crank pin from the same axle. Thus, the general result secured is, that whenever the crank is in horizontal position, and the piston at beginning or end of stroke has its slowest movement, the eccentric is vertical, and the valve in middle of its throw has the most rapid movement, as required for duly opening the ports; and *vice versa*. An engine moving at high speed, say 38 miles an hour, or 1,093 yards a minute, the driving wheels 5 ft. 3 in. in diameter, or about 16 ft. 6 in. in circumference, the number of strokes of each piston must be abóut 200, and of separate or half strokes 400 per minute; if the length of each be 18 inches, this gives the piston an average velocity of 192 yards per minute, or 10 feet per second, *i. e.*, more than three times the usual speed in stationary engines; thus it will appear how important is the proper timing of the steam changes within the cylinder, and how nice must be the adjustments required for economical and perfect working. The third of the objects above named is, with any method of valve motion, accomplished by means of a reversing handle at the command of the engineer, which by lever and links is made to detach the eccentric rod or reverse its action on the valve, and consequently the direction of movement of the crank and of the wheels. This is employed as an auxiliary means of arresting the movement of the engine and train at high speed, or for the purpose of backing the engine. The second of the three objects named above is that which has presented the chief difficulty. The outer edges of a slide valve determine the times of admission and of suppression; the inner, the times of release and compression. Outside "lap" of valve conspires with "lead" to secure early admission of steam and early and efficient release; inside lap defers release and prolongs expansion; while inside clearance shortens both expansion and compression. Thus, these three elements, the lap, lead, and throw of the valve, control the distribution of the steam; and any change in either affects the distribution in a definable way. Up to about 1843, a variety of complicated expansion gear for locomotive slide valves had been devised, for varying the travel or length of throw of the valve during stroke, and hence the expansion; and though the link motion then introduced has since come into almost universal use, yet such devices, with single or with complex or cut-off slides, have continued since to be presented. Of the link motion, the simplest and most satisfactory solution of the problem, the construction in one form of shifting link is represented in fig. 9, while the mode of action will be better understood by aid of the diagram, fig. 10. In the figures, *v r* is the valve rod, which by a stud or pin within the link can be made to stand at different heights within it; *l l* is the link; *e* is the fore and *e'* the back eccentric, jointly giving movement to the link; their centre of motion is at *o*, their centres of form, *c*, *c*; *o c*, *o c* are their radii; *f* is the fore and *b* the back eccentric rod, the relative positions appearing reversed in the two figures; C is the crank; *o a* its radius; *a r a* a half revolution of the crank; *v* is the slide valve; *p p* are the steam ports and *E* the exhaust, to the cylinder; *n* represents the reversing link, *h* the reversing lever; but the mode of reversing is better shown in fig. 9, in which *k* is the supporting link, B a bent lever, with counterpoise W; R R a rod from the lever B to the reversing lever or handle, L, at the hand of the en-

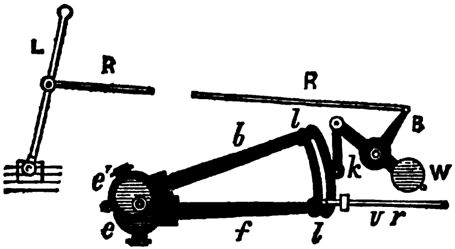

Fig. 9.

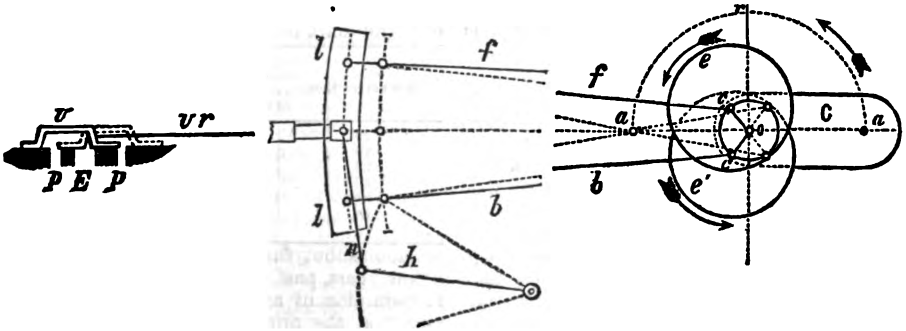

Fig. 10.

gineer. Fig. 10 represents the shifting link motion, in mid-gear, at beginning of the back stroke. The origin of the link motion, in an impracticable form however, has been traced to a Mr. Williams of Newcastle; it was worked out by Mr. Howe, and applied to Stephenson's locomotives, and is generally accredited to Robert Stephenson. The motion attained is equivalent to that of a variable eccentric. If two eccentrics be differently set on the same axle, each will be the equivalent of a crank, giving to its rod a definite throw or stroke equal to twice the eccentric radius; and the movement of either eccentric in any part of its revolution can be resolved into two component motions, tangential and radial. Now, in the link motion, two eccentrics have their centres of form in nearly opposite directions from the same axle on which they turn, and their rods, instead of attaching to the valve rod, take hold of the upper and lower ends of a curved, slotted link; the valve rod by a stud or a pin within the slot can be so shifted as to be worked from either end of the link, or from intermediate points in its length. The motion of the link is compounded of the distinct motions of the eccentrics, which, as respectively intended to give forward and backward strokes, are called the fore and back eccentrics. The motion of each eccentric prevails in that half of the link to which it is coupled, the motion at middle point being equally composed of the two; so that the horizontal movement, distance of travel, or throw which the link will impart to the valve rod, is a minimum when the rod is actuated from the middle of the link, and increases toward the extremities, but with a movement in the two in opposite directions. The link is shifted, or the block and valve rod pin within it, by means of the reversing lever at the hand of the engineer; and thus various lengths and speeds of throw of the same valve are secured with various periods of admission, expansion, and release of steam. Link motions are thus of two classes: 1, the stationary link with shifting block; 2, the shifting link with stationary block. With these the results attained slightly differ; and beside, the principle, application, and effects of the link motion are capable of very great variation. Usual dimensions are, to give to the valve a lap of 1 inch, lead 5/16 inch; the throw of each eccentric, 4½ inches; length of eccentric rod, 54 inches; length of the link between attachments of these rods, 12 inches; with dimensions of the subsidiary links and levers in the proportions required. Then, certain main positions of the link and valve rod, as secured by the reversing lever, are as follows:

Positions.	Eccentric used.	Length of travel of valve, inches.
Full gear forward..............	Fore.	4¼
Half gear forward..............	Fore.	3¼
Mid-gear.......................	Both.	2¼
Full gear backward.............	Back.	4¼

With the stationary link a constant lead, through fore and back gear, and for forward and back strokes, may be had. This the shifting link fails to give; the lead here varies with the expansion, being least in full gear, and a maximum in mid-gear; but it may be made the same for the forward and back strokes. An admission through .75 = ¾ stroke, is attended with a mean expansion of 16 per cent., with release at .91 of stroke; while .50 admission gives about .30 expansion, exhausting at .80 = ⅘ stroke. The least attainable percentage of admission, with the different forms of link, varies from .11 to .17 of stroke.—If, in an engine working under a given set of conditions, including a given action of valve gear, the boiler cease to supply the number of cylinderfuls of steam required at the velocity, the pressure on the piston and the speed proportionally fall; or if the ascent of grade increase, the resistance and work being greater, the piston cannot advance so rapidly, and the speed again falls, unless the power of the boiler suffice to raise the tension of the steam. On the other hand, if while the grade remains the same the steam pressure rises, or the pressure the same the grade diminishes, the engine runs faster, and until the increasing resistance mounts to an equilibrium with the power. Thus the true measure and limit of power of the locomotive engine are in the evaporative power of the boiler. But the calculations of power and speed belong to the subject and works of railway practice. The following table presents some examples of the tractive resistance per ton gross of engine, tender, and train on a level:

Speed, in miles per hour.	Resistance, in lbs. per ton.	
	Under superior conditions.	Under ordinary conditions.
10	8.6	13.0
20	10.8	15.5
30	13.2	20.0
40	17.8	26.0
50	22.6	34.0
60	29.0	43.5
70	36.6	55.0

—Since about the year 1830, and until within a few years past, the rapid improvement and introduction of railway locomotion had quite absorbed the attention of inventors, and the problem of steam carriage on common roads was comparatively neglected. The difficulties in the way of such propulsion of vehicles, moreover, remain considerable. In the great exhibition of 1851 there was but one locomotive for common roads exhibited; but since that time, in England, no fewer than 9 varieties of such engines have attracted attention, some of which have been employed for agricultural or for carrying purposes, and perhaps the most successful of which are the traction engines of Bray and Boydell. Among those interested in the subject in the United States, Mr. J. K. Fisher has thus far been the most successful. He built in New York in 1852 a small experimental steam carriage, with easy springs. This, on the Broadway pavement, in night trials, outran horses; but it had not steam enough for common roads. He has now (1862) nearly completed a large carriage; and four self-propelling fire engines of Messrs. Lee and Larned's patent (see FIRE ENGINE) have been built, so far as their locomotive apparatus is concerned, on his plan. These all have springs of great flexibility, and yet run as steadily as ordinary carriages. This result is attained by using radius rods to hold the driving axle at a constant distance from the engine shaft, which revolves in fixed bearings in the main frame, allowing the axle to swing or to rise and fall, parallel rods being introduced to transmit the power. The parallel and radius rods terminate in ball and socket joints; and the lateral swing is limited by a transverse radius rod held by a spring. By these several methods, not only are the necessary lateral movement and flexure due to roughness of roads allowed, but also the rolling or oscillation of the carriage, without twist of the frame, or interfering with the accurate transmission of the power to the driving wheels. Of the steam fire engines, the cylinders are of $7\frac{1}{2}$ inches diameter and 14 inches stroke; the valves operated by a stationary link with reversing lever, and securing expansion in any desired degree. The power is derived from Lee and Larned's annular steam boiler. The speed of steam carriages on good common roads has been made to reach 30 miles per hour for short distances, and for journeys of three miles 20 miles per hour.—STEAM NAVIGATION. Paddle wheels, propelled by windlasses turned by men, or by animal power, were to some extent in use in the war galleys of the ancient Egyptians and Romans; it is uncertain whether they afforded any essential advantage over the use of oars. Even if Blasco de Garay, mentioned in treating of the steam engine, accomplished what has been claimed, the entire abandonment of his project shows that it must have been unsatisfactory; so that he can in no way be regarded as the originator of steam navigation. The attempts made in England and France, prior to 1730, led to no result. Jonathan Hulls in 1736 described a method of propulsion by a stern wheel acted upon by an atmospheric engine; but he is not known to have put his plan in practice. In France, from 1774 to 1796, the count d'Auxiron, the brothers Périer, the marquis de Jouffroy, and M. des Blancs severally constructed and tried boats to be propelled by steam, none of which were successful. In 1786 John Fitch, of Pennsylvania, propelled by a very small engine, cylinder one inch in diameter, a skiff at fair speed; and in the same year, by a 12-inch cylinder, a boat on the Delaware, the speed however being in this case very slow. In 1787 Rumsey, of Virginia, attained a speed of at least 3 miles an hour on the Potomac, by reaction of water taken in at the bow of his boat by a steam engine and forced out at the stern; he tried this plan in England in 1793, making 4 miles an hour. Fitch's boat of larger size, placed on the Delaware in 1790, and making regular trips through the season, at an average of $7\frac{1}{2}$ miles an hour, did not still lead to the general introduction of steam propulsion; though this clear-sighted pioneer predicted the navigation by such means not only of the western waters of America, but also of the Atlantic ocean. Thus, the actual moving of boats by steam certainly occurred in this country, and perhaps in France, before the trials of Miller and others in Scotland, on which latter, however, the English endeavor to found their claim to priority. Patrick Miller and William Symington, in 1788, propelled on Dalswinton loch twin or double pleasure boats, by means of a paddle wheel placed between them, and by an engine with a 4-inch cylinder, attaining 5 miles an hour. With a larger engine, in 1789, they navigated the Forth and Clyde canal, at a rate of 6 to 7 miles an hour; but owing to insufficiency in the machinery, they were compelled to abandon further attempts. In 1796 John Fitch moved a small boat on the Collect pond, in the city of New York, by a small engine and a worm or propellor screw projecting from the stern of the boat; this being, probably, the first employment of the screw for propulsion. In the same year a work was published in Florence, claiming that an Italian, Serapino Serrati, had successfully propelled a boat by steam on the Arno; if this be true, still no further practical result followed upon it in that quarter. Meanwhile, Robert Fulton was in England and in France, and, if not previously interested in steam propulsion, became so upon inspection of Dr. Cartwright's steam barge, and Earl Stanhope's boat with duck-feet paddles under the quarters, neither of which however proved successful. In 1798 the legislature of New York granted to Chancellor R. R. Livingston of that state, who had been experimenting with steam for boats, the right to navigate the waters of the state by steam for 20 years; and though he failed to satisfy the condition of the grant by propelling a boat 4 miles per hour within the year, the grant was in 1803 renewed, and the time of fulfilment extended to 1805, and afterward to 1807. In 1801 Mr. Symington completed for Lord Dundas a steamboat, the Charlotte Dundas, its engine having a horizontal cylinder of 22 inches diameter and 4 feet stroke; this made, with boats to 140 tons burden in tow, on the Forth and Clyde canal, $3\frac{1}{4}$ miles per hour; but a prejudice excited by its washing the banks of the canal compelled its abandonment. About 1799, Mr. Livingston meeting with Fulton in Paris, they became together interested in projects for steam propulsion, and, notwithstanding the jealousy of Des Blancs, made at least two experiments on the Seine previous to 1804, neither of which succeeded. The breaking in the middle and sinking of their boat in the first instance by the weight of the engine, is believed to have led to Fulton's subsequent introduction of the strong and light framing intended to uphold the weight of large engines, which is one of the characteristic excellences of American steamboats. It was in 1804 that Oliver Evans, at Philadelphia, propelled his steam dredging machine, the Oructor Amphibolis, upon wheels on land, and subsequently by a paddle wheel upon the water. In the same year John Stevens, of Hoboken, N. J., propelled in the waters about New York a small boat by means of an engine, the steam for which was furnished by a very small tubular boiler, the power being applied by means of a form of screw also invented by him, and substantially that most approved at the present day. Fulton, meanwhile, had again visited England and Scotland, inspecting in the latter country one of Symington's later boats, and receiving from him information respecting its construction and working. Returning to New York in 1806, he commenced at once building, in conjunction with Mr. Livingston, a steamboat for use upon the Hudson. This boat, the Clermont, was of 160 tons burden, 130 ft. long, 18 ft. wide, and 7 ft. deep. She was provided with an engine from the establishment of Boulton and Watt, with a single cylinder 2 ft. in diameter and of 4 ft. stroke; boiler 20 ft. long, 7 ft. deep, and 8 ft. broad. The diameter of the paddle wheels was 15 ft., the boards 4 ft. long, and dipping 2 ft. in the water. On the morning of Aug. 7, 1807, Fulton with a few friends and mechanics, and 6 passengers, and leaving on the shore an incredulous and jeering crowd, started for Albany. The distance, 150 miles, he made at a speed of nearly, and on his return of full, 5 miles an hour. As the speed was still less than had been anticipated, the boat was lengthened to 140 ft. keel, and, being otherwise altered, was early in the year 1808 placed for regular trips on the Hudson between the cities already named. By tracing thus far the history of steam propulsion on water, we find that Fulton cannot be said to have been the originator of steam navigation, nor indeed the inventor of mechanism for such navigation; but the credit belonging to Fulton is that of having been the first successfully to cross the chasm from mere attempts to positive achievement—the man through whose energy and skill was first secured that combination of means which rendered navigation by steam at once practicable and profitable. Very properly, therefore, do the committee of the first London exhibition, 1851, say: "Many persons, in various countries, claim the honor of having first invented small boats propelled by steam; but it is to the undaunted perseverance and exertions of the American Fulton that is due the everlasting honor of having produced this revolution, both in naval architecture and navigation." Within a brief period after the first trip of the Clermont, Mr. Stevens launched his boat, the Phœnix; but as Fulton's success had secured the right to navigation of the waters of New York, R. L. Stevens, son of the former, boldly took this boat round to Philadelphia by sea, this being indisputably the first instance of ocean steam navigation. (See Stevens.) He also greatly improved the speed of his boats, attaining in 1814 to 13½ miles an hour. In 1812 the first regular passenger steamer in Britain, the Comet, built for Henry Bell, appeared on the waters of the Clyde. This vessel was of 40 ft. keel, 10½ ft. beam, 25 tons burden, and 3 horse power; her speed was 5 miles an hour. In 1814 Boulton and Watt first applied two condensing engines, connected with the shaft by cranks placed on it at right angles, in a steamer to run upon the Clyde. This plan has since become for boats of larger size a very general one. In 1818 the Savannah, a New York built ship, with side wheels, and propelled by steam and sails, crossed the Atlantic to St. Petersburg *via* Liverpool, reaching the latter place direct from New York in 26 days, and returning in safety. Although this was the first crossing of the Atlantic by steam, yet as the ship had but small engines, and was unsuited to the risks of such a voyage, the event scarcely demonstrated the practicability of ocean steam navigation. The first regular passages were made by the Sirius and Great Western in 1838, the former making the trip from London to New York in 17 days, and the latter from Bristol to New York in 15 days. In 1811 Fulton and Livingston established a ship yard at Pittsburg, and built an experimental boat, the Orleans, the first ever placed on our western waters. This boat had stern wheel and masts; her first trip from Pittsburg to New Orleans was made in the winter of 1812. This seems to have been the first successful application of the stern wheel, now in very general use on the western rivers, especially for boats of light draught. (See also Ship.) Of the best class of American river steamers, a good example is the New World, built in 1847, of 1,400 tons, and placed on the Hudson between New York and Albany. Her engines were built by the firm of T. F. Secor and co., condensing, of 76 inches diameter and 15 ft. stroke, provided with double balance valves and Stevens's cut-off, worked by the usual eccentrics, lifter rods, and rock shafts with their levers; the two boilers being circular, and with single return flues. Of this boat the length is 375 ft.; breadth, 36 ft., over guards 69 ft.; depth of hold, 10 ft. 6 in.; the average speed of run, landings not included, is 18½ miles per hour. The steamers City of Boston and City of New York, running on Long Island sound, embody a more recent style, in some respects, of construction and of propelling machinery; their engines are from the Novelty iron works, New York, hull by Sneeden and co. The Daniel Drew, running upon the Hudson, has recently made, on a trial trip, a speed of 22 miles per hour. The successful introduction of the screw was through the experiments of Capt. Ericsson and F. P. Smith, on the Thames, in 1837. The speed attained, with a large ship in tow, and against tide, was 4½ knots an hour. The next screw vessel, the Robert Stockton, built in 1839 for an American gentleman, was also successful; while the success of the Archimedes, in 1840, of 232 tons and 80 horse power, was so great as to attract the attention of the English admiralty; and from this time the screw advanced rapidly into favor, employed either as sole or as auxiliary means of propulsion for men-of-war or fast-sailing merchant vessels.—Many peculiarities in the construction of marine engines, their accessories, working, and forms of boilers, have already been mentioned in treating of the steam engine. To combine the three things requisite in a steam vessel, the ship, the engines and boilers, and the wheels or other propeller, each of which is in itself a complex study, is one of the most difficult problems of modern engineering, demanding in the highest degree theoretical attainments and practical skill. The marine steam engine is necessarily made as light, compact, and at the same time as economical of fuel as possible. One of its oldest varieties, the side lever form, is still in use in some of the largest paddle steamers, among them those of the Cunard line. Although it has many advantages, yet, in view of the value of space and weight in merchant and passenger steamers, it is probable that the lighter and more compact direct-acting forms of engine, though more expensive in working, are in the total more economical. The screw propeller, or screw, which is the means of propulsion in those vessels named from this circumstance screw steamers or propellers, consists in its simplest form of a very strong metallic plate, standing edgewise on a cylinder or shaft, and winding round it like the blade of an auger, or of two or more blades or vanes, forming parts of such spirals. The shaft is made very strong, continued within the hold of the ship, and intended to revolve. The screw or blades are upon that part of it projecting from the stern of the ship, and space for the turning of the blades is allowed by a vertical oblong recess in the keel and stern, just before the rudder. The position of the shaft is such that the screw shall usually be wholly submerged; and upon the portion of the shaft within the hold one or more engines are made to act, either by cranks formed on the shaft, or by means of geared wheels. The use of such wheels admits of a slow speed of piston with a high speed of the screw; while on the other hand these wheels are necessarily cumbrous, their wooden teeth are liable to be "stripped" or broken off by a sudden stroke of the sea upon the screw, and they are unavoidably attended with a loud and disagreeable rumbling noise. Vessels of considerable draught admit of a diameter and pitch of screw sufficient for propulsion, without undue speed of the piston and without gearing. In the best marine engines the deduction for friction, the working of valves, pumps, &c., from the indicated or gross horse power, in order to find the effective or available propulsive power, may be taken as usually about 25 per cent. To increase the linear advance of a screw against the water, which corresponds with a given rate of turn called the "pitch," the number of revolutions of the screw must be increased; and as the pitch best for effect is limited by the diameter of the screw, and this by the draught, and as for each revolution of the screw two journeys of the piston are allowed, the time, and hence the stroke, is necessarily short; the disadvantages are, the more frequent recurrence of the dead points, a proportionately greater loss of steam in filling the passages to the cylinder, and a narrower limit to the employment of expansive working. Still in most marine engines, whether for paddles or screws, steam is worked expansively, though seldom to the same extent as in land engines; the best results being secured when the cylinder is surrounded both with jacket and clothing, or the steam sufficiently superheated. In respect to the necessity of preventing accumulation of saline matters in the boilers of sea-going vessels, with consequent raising of the boiling point and tendency to scale within the boilers, it is now the usual practice to blow off the requisite quantity of brine continuously, and from the surface as well as the bottom of the boiler, in due proportion to the quantity of feed water admitted, so as to keep the water at that degree of saturation found by experience to be attended with little or no deposit. The density of the brine is known either by the hydrometer, or by instruments for the purpose termed salinometers. One of the most dangerous and troublesome tendencies of a boiler is that known as priming, as, beside the great loss of heat and of steam pressure occasioned by it, it may also cause the breaking down of the engine by the shock of the piston on the incompressible fluid in the cylinder. Remedies resorted to are, the increase of size of the steam chest, increased height of the steam pipe orifice above the surface of the water, and sometimes the adding of tallow to the water in the boiler. By the throttle-valve of marine engines, the flow of steam to the engines is usually regulated or shut off by hand. The ordinary vertical form of governor is of course wholly inapplicable, through the pitching and rolling to which the ship is liable. But in a heavy sea, one wheel or the screw being sometimes lifted quite out of the water, the engine begins to "race," *i. e.*, to fly off at very high velocity, the liability to this result being greater with screw than with paddle steamers; and in such case an automatic and prompt-acting substitute for the hand becomes very desirable. The desideratum in these cases has recently been supplied by 3 or 4 different contrivances. The earliest of these were Silver's "momentum-wheel governor," and his "four-ball" or "balanced governor;" these instruments act equally well in any position. The same result is secured in a more recent invention, Porter's "marine governor," with suspended and balanced balls, acting by compression, according to speed, of a spiral spring. In all these forms it is true that the remedy must be applied after the evil has begun to develop itself. Jensen, of Copenhagen, has accordingly attempted to produce a prompt and perfect marine governor, by admitting the water of the sea to rise in two small cylinders directly through the bottom of the vessel, and as near as may be to the screw or wheels; pistons moving on and with the water in these cylinders, are made by levers to control the steam valves; and thus the irregular immersion of the vessel itself is caused to regulate the supply of steam to the engines.—Paddle wheels are generally of two kinds, those with common or fixed, and those with feathering floats. Wheels with fixed floats, when a vessel is anchored or is yet moving slowly, act at great disadvantage; since those entering the water strike it obliquely, and waste much of the power in a tendency to lift the bow of the vessel, instead of propelling it, and those leaving the water lift much dead weight in the form of back water. But when the vessel has acquired fair or rapid speed, its very motion largely overcomes these difficulties, and the dip of each float into the water, and its withdrawal out of it, virtually occur nearly edgewise, the effect being similar to the "feathering" of an oar by the rower. But with a paddle wheel badly proportioned, immersed too deeply in the water, or attached to a slow boat, the unfavorable action above referred to is largely experienced. By making the floats movable about horizontal axes through the middle, and controlling their position by a second wheel, set eccentrically to the paddle wheel, as well as in other ways, they are made to feather on entering and leaving the water. By such arrangement the speed has been increased, and the vibration due to the movement of the wheels greatly reduced. The excess of the velocity of the wheel above that of the vessel, called the slip, is in favorable circumstances about ⅕ the speed of the latter; feathering wheels have less slip. As, in the screw, one, two, or three threads are readily placed within the distance of a single coil, we have thus single-threaded screws, double-threaded, and so on. The distance to which the screw would enter a solid during a single revolution, is of course the distance or length of one complete turn; and this is the measure already named the pitch of the screw. But since, worked in water, the medium gives way in part before it, the screw does not advance the full amount of its pitch, and this deficiency is called the slip of the screw. Supposing the screw cut into portions by planes at right angles to its axis, these would be the vanes or blades; and according as the screw was two-threaded or three-threaded, two or three of these would stand opposite each other. This form, in which each blade is but a small portion of the complete pitch, is that now commonly in use. What is called negative slip in propeller screws, is that result in which, owing to the drawing by the ship of a wake or current after it, the screw acting in this current causes the vessel to advance faster than the blades of the screw at the same moment are entering the water or would enter a solid surrounding them. Owing to the current, however, the real slip is not apparent. In reference to the comparative value for propulsion of paddle wheels and screws, it may be said that when both are in their best trim, and well proportioned to the vessels and the engines, they are about equally efficient. The screw, however, in ordinary weather, is apt to have a more uniform immersion and action; while a great disadvantage of its use is the increased speed which must be given to the engines.

STEARIC ACID (Gr. στεαρ, tallow), a fatty acid obtained from mutton suet, and other fats that contain stearine, by the process described in CANDLE, vol. iv. p. 355; symbol, $HO,C_{36}H_{35}O_3$. When recrystallized from ether, until the fusing point becomes constant at 159°, and slowly cooled, the acid forms beautiful, colorless, transparent, rhombic plates; these melt into a colorless oil, tasteless and without odor, and when quickly cooled the substance concretes in a white crystalline mass, which is insoluble in water, but readily forms with hot alcohol a solution having acid reaction. It is the material of the so called stearine candles. Stearic acid exists in fats in combination with glycerine, forming stearine, from which it is separated by saponification. (See GLYCERINE.) It combines with numerous bases, and forms with them both acid and neutral salts, called stearates. Stearate of soda is the basis of ordinary hard soap; stearate of lead is one of the constituents of the common lead plaster.

STEARNS, a central co. of Minnesota, bounded E. by the Mississippi, and drained by Sauk river and lake; area, 1,379 sq. m.; pop. in 1860, 4,505. A portion of the county is prairie, but the W. part is mountainous. There are numerous lakes and streams. Capital, St. Cloud.

STEATITE, or SOAPSTONE, a compact variety of the mineral species talc, consisting of silica 62.14, magnesia 32.92, and water 4.94 per cent., being a hydrous silicate of magnesia. It occurs in massive beds among the metamorphic rocks, often associated with serpentine. The stone is distinguished by its soft and uniform texture, which admits of its being cut by the knife or saw, especially when freshly quarried, and also by its property of withstanding intense heat. Its colors are coarse gray and grayish green, sometimes yellowish; the texture generally granular; lustre dull; specific gravity 2.65 to 2.8; structure compact, sometimes lamellar; and to the touch it is greasy like soap. When crystalline or in thin and flexible foliæ of pearly lustre, it is commonly known as talc, of which the substance employed under the name of French chalk for removing grease spots is a variety. Meerschaum is another variety. The uses of soapstone are numerous, and beds of it furnishing large blocks unmixed with other substances are valnable. Such are found at Grafton, Athens, Westfield, and Marlborough, Vt.; at Francestown, Pelham, Keene, and other towns in New Hampshire; at Middlefield, Chester, and other places in Massachusetts; between Baltimore and Washington in Maryland; in Loudon co., Va., Guilford co., N. C., and numerous other places unworked on the range of the metamorphic rocks through the southern states.—The rock is sawed into slabs and used for jambs for fireplaces, for lining stoves, or for the whole stove. After being heated it takes a good polish and assumes an apple-green color. It is also turned in lathes for various articles, and is bored for water pipes; formerly it was much used for inkstands. The sizing rollers in cotton factories are made of soapstone, for which it is especially adapted from not being affected by acids nor liable to change of form by varying temperatures; the rollers are sometimes 4½ feet long and 6 inches in diameter. The stone has been pulverized to be used with other materials in the manufacture of porcelain; it makes the biscuit semi-transparent, but brittle. The powder is especially useful as a lubricant for the journals of heavy wheels, and is also used as a polishing material for serpentine, alabaster, &c. It is the basis of cosmetic powders and of certain crayons. The spotted steatite, cut into cameos and calcined, assumes an onyx aspect. The softer varieties make excellent stoppers for the chemical apparatus used in distilling or subliming corrosive vapors. By the American aborigines soapstone was found to be a convenient and useful material for culinary utensils, and many of the ancient relics now met with are of this easily carved stone. The Chinese have employed it so generally for their idols and other figures connected with their religious rites, that it has sometimes been known as the "figure stone."

STEEL, a variety of iron, distinguished for the extreme and varying degrees of hardness of which it is susceptible, and for possessing at the same time the fusible property of cast iron and the malleability and welding property of wrought iron. Some notice of it has already been given under IRON, and some of its most remarkable properties are treated in the article DAMASCUS BLADES. In composition it holds a place intermediate between wrought or malleable iron and cast iron; the first being simply iron; steel, iron with 1 to 1½ per cent. of carbon; and cast iron containing about 4 per cent. of carbon. As the proportion of carbon in steel increases, the metal approaches cast iron in its properties, becoming hard and brittle, and increasing in fusibility; but with diminishing proportions of carbon it assumes more and more of the softness, toughness, and malleability of wrought iron. Those steels of the former character are designated as high, and those of the latter as low or mild. Other substances beside carbon, that are sometimes present to a very small amount, are commonly regarded as impurities; although some of them exercise an important, and it may be at times a useful, influence upon the properties of the metal in its application to special purposes. Nitrogen, according to Prof. R. Marchand, is always present to the amount of about ⅓ per cent., associated with about 3 times as much carbon. In iron nitrogen is found by Schaufhäutl in proportions varying from 0.532 to 1.2 per cent., in white pig; and in all the processes of producing steel, as affirmed by Mr. C. Binks in a paper read before the society of arts in 1857, nitrogen in some form must be present.—The following are some of the properties of steel. When broken it exhibits in the fracture a grayish color, lighter than that of iron; its structure is granular, and in the best steel is very fine. This is produced by condensation by hammering or rolling, and is accompanied by a susceptibility of receiving a high polish, which is much less liable to be affected by rust than a polished iron surface. The metal is inferior to iron in ductility and malleability, and is worked down under the hammer or rolled with much greater difficulty. When balanced upon the hand and struck with a hammer, it gives a clear ringing sound, indicating by its peculiar intonation to the practised ear the quality of the metal. It acquires a higher degree of elasticity than any other solid body, and is hence best adapted for a great variety of springs. It is more slow than iron to become magnetic, but retains this property more tenaciously. Its melting point is given as 2,786° F., which is considerably higher than that of cast iron, and lower than that of wrought iron. It is not adapted for casting into moulds of intricate form, as well by reason of the high temperature of its melting point, as on account of its not thus acquiring the density and toughness which these forms may require, and which are imparted to steel bars by subsequent processes of hammering and rolling. Steel may be welded, but with more difficulty than wrought iron, especially if it has been first melted or cast; in this case a thin film of borax should be interposed between the surfaces to be united. A perfect union may be effected between wrought iron and steel by placing a bar of the former, with one surface well polished, in the mould into which the steel is cast. The two metals thus united, when rolled out, are sometimes employed for chisels, plane irons, &c., one face being of steel and forming the cutting edge, while the other being of iron insures the greatest toughness. A steel plate is rapidly cut by the edge of a disk of soft iron, made to revolve with great velocity. Intense heat is generated at the points of contact, and the particles of steel are thrown off in a state of ignition. The iron is very little worn or otherwise affected. Cast iron cannot be thus cut. The most striking peculiarity of steel is the different degrees of hardness it assumes by changes of temperature. When heated to redness and slowly cooled it is not much harder than iron, but by sudden cooling it is rendered very hard and brittle; and the higher the temperature to which it is raised and the more sudden the cooling, the greater is the hardness. On this principle is based the process of tempering, by which any desired degree of hardness is obtained. The different temperatures are indicated by a succession of colors which the metal takes while heating, and these colors consequently serve to direct the workman who seeks to obtain the hardness that is appropriate for certain uses. Thus a very pale straw color, corresponding to 430° F., is the right color for lancets; a deeper shade, 450°, is adapted for razors and most surgical instruments; an orange yellow, 470°, for penknives; a brownish yellow, 490°, for cold-chisels; a brownish yellow tinged with purple, 510°, for plane irons; a purple, 530°, for table knives and scissors; a pale blue, 550°, for swords and watch springs; a common blue, 560°, for fine saws and dirks; very deep blue black, 600°, for pit saws. At 630° it becomes sea-green, but above this temperature the colors disappear, and if slowly cooled the steel becomes very soft, so that it can be worked with ease, after which it may be tempered as desired. A more exact method of tempering than by the color is to immerse the steel in heated baths of mercury or of oil, the temperature of which is carefully regulated according to the indications of the thermometer, graduated up to the boiling point of mercury. The cooling may be effected by plunging the articles into cold water, into cold mercury, or oil, or if they are very small by waving them through the air. By hardening steel its volume is increased.—The early history of steel is involved in much obscurity. It is supposed that the substance was known to the ancient Egyptians, and that articles made of it were designated in their drawings by a blue color. In the Hebrew language there is no word specially applicable to it; but it is supposed the hard "iron from the north," spoken of in Jeremiah xv. 12, may have been steel from Chalybia, a country famous for its iron production. There are several allusions in the old Greek authors to the hardening of a metal, commonly understood to be steel, by plunging it when hot in cold water; thus when Ulysses pierced the eye of Polyphemus with a burning stick, Homer describes the hissing as like that of red-hot iron when plunged by the smith into water to harden it. Aristotle describes the processes of the Chalybes by which they converted iron into steel, purifying it from the scoriæ by a succession of meltings. The word στομωμα, applied to the new product, is used by various Greek writers to designate something distinct from σιδηρος, iron, and, when described at all, having the peculiar hardness and uses of steel. Daimachus, a writer contemporary with Alexander the Great, names under the same designation four varieties of steel: the Chalybdic, suitable for carpenters' tools; the Lacedæmonian, for files, drills, gravers, and stone chisels; the Lydian, for the same and also for knives and razors; and the Synopic. The Latin writers called the same substance *acies*, and *ferri acies*, whence the French *acier*, steel. Beckmann affirms on the authority of Hesychius that the term *adamas* originally meant steel, and should be so translated when applied to chains, bars, gates, &c. Yet it is remarkable that no articles of steel have been found among the relics of the nations of antiquity, even to the period of the Roman empire. The iron and steel of India are both mentioned by ancient writers, and the latter is supposed to be the same as the wootz, of which 100 talents, called *ferrum candidum*, were presented to Alexander in India, and which is still prepared there by a very primitive method. The Hindoos charge their crucibles with bits of malleable iron, mixed with wood and covered with the leaves of trees, which, when the metal is thoroughly heated, furnish the carbonaceous and nitrogenous elements of the steel. Fusion ensues, and the steel, of very superior quality for fine cutlery, is finally found in a button at the bottom of the crucible. During the middle ages the art of making steel existed in the highest perfection in Turkey and the countries of the East; but in western Europe it was comparatively little known. At Eisenärz in Styria it has been practised ever since the 8th century. Even as late as the 17th century few persons practised it in England, and the first patent granted for this manufacture was dated April 8, 1626, to Richard Lord Dacre, Thomas Letsome, and Nicholas Page, for "apparatus for making steel," according to the invention of Letsome. Foreign iron alone was used for it. About 1670 mention is made of steeling articles by "boiling them in sow-metal." The carbon of this is given up to the wrought iron articles in sufficient quantity to convert them into steel; and by Vanaccio this was carried so far that the cast metal was also brought down to the steel point, making however poor steel. This is probably the same operation that is spoken of by Agricola, Imperati, and others, as practised at an earlier period on the continent. The manufacture by cementation is said to have been practised at Bromley by John Heydon as early as 1697, but was first made generally known by Réaumur, and described in his work on steel published in 1722 (see RÉAUMUR); and cast steel, it is stated, was first made by Mr. Huntsman at Attercliff, near Sheffield, in 1770. The subject attracted some attention in the Connecticut colony as early as 1655, when the assembly of New Haven granted privileges to John Tucker of Southold, Long island, who undertook the manufacture. There is no record however of his succeeding in it. Joseph Higby, an ingenious blacksmith of Granby, Conn., who also distinguished himself by his coinage of the Granby coppers, memorialized the legislature of Connecticut in 1727, that he had "with great pains and cost found out and obtained a curious art, by which to convert, change, or transmit common iron into good steel, sufficient for any use, and was the very first that ever performed such an operation in America." He produced samples of good steel, and obtained a patent for 10 years.—Steel is obtained, first, either directly from iron ores, the carbon being infused into the iron as this is revived from the natural oxides; or, second, from cast iron, by removing from it a portion of the carbon it contains; or, third, from bar iron, by causing this to absorb a due proportion of carbon; and in procuring it from each kind of manufactured iron several processes are employed. From certain rich magnetic ores steel may be worked in a small way directly, even in the blacksmith's forge; and in the Catalan furnace the manufacture has been carried on upon a considerable scale. When this is the special object of the operation, the process of reduction is somewhat varied, with the view of checking the decarbonizing action before it is carried to the point of malleable iron. The operation is stopped at a point determined by experience, when the loop is removed and drawn out into bars under the hammer. By long continued hammering the steel thus obtained may be made to acquire a tolerably uniform density and composition; but a more expeditious method is to convert it into cast steel by melting in crucibles, in which condition it is kept from 3 to 4 hours, when it is poured out into cast iron moulds. The method is not largely practised, owing to the want of uniformity in the product.—Among the methods of treating cast iron for steel, that of partial refining by puddling has been long practised in Isère in S. E. France, in Thuringia, Westphalia, Styria, and Carinthia. What is known in this country as German steel, produced from pig iron made from spathose iron ores, is chiefly puddled steel carefully refined. In Isère the cast iron, usually gray, sometimes a sublamellar white iron, is first melted in a furnace with a single tuyère, together with rich scoriæ of the preceding operation, with charcoal. The iron is slowly brought to the melted state, and is thus kept about 8 hours. The refining then commences, and lasts about 6 hours. The temperature is kept lower than in ordinary refining fires, just sufficient for the scoriæ to remain in a fluid condition. The charge is worked up with a ringer, as in ordinary puddling, and the oxygen which removes the carbon from the cast iron is in part derived from the oxide of iron of the scoriæ. To check its too rapid action the draught is diminished and silicious sand is thrown in. Steel "comes to nature" at the surface, forming a spongy crust. This is broken up, pushed toward the extreme end of the furnace, and formed into little loops of 30 or 40 pounds weight each. As these are produced about one every 10 minutes, they are taken out and hammered into blooms. About 8 hours are required to remove the whole charge of about a ton weight, making 22 hours for the whole operation. The blooms are afterward heated in a separate fire, and then drawn down into bars. About 132 parts of cast iron are required for 100 of steel. In Westphalia lamellar manganesian white irons, which are rapidly refined, are treated for steel in furnaces like the refinery fires. The cast iron is thrown in, in quantities of about 75 lbs. at a time, and when sufficiently refined the loops are taken out and drawn down under the hammer. The steel is used for making scythes, cutlery, and swords, after being well refined. In the New Jersey iron region, and in that of N. New York, puddled steel has been made to some extent. The best charcoal iron is required for the purpose, and manganese is sometimes added to the charge, the purpose it serves being apparently to lengthen out the time of the refining, and thus diminish the risk of passing the desired point of decarbonization. The process requires much care and skill on the part of the workman, and the product is rather a steely iron, or mixture of steel and iron, and this of varying and uncertain quality, than good steel. Whether puddled steel has ever been cast or not is uncertain. It is supposed that this may be done in Krupp's works at Essen, which will again be referred to. Other methods of treating cast iron for steel will be mentioned, after describing the process in general use of producing steel from bar iron. Nearly all the steel of commerce is prepared from bar iron by what is called the "cementation process." It consists in exposing the iron, buried in charcoal, to long continued heat. The operation is conducted in a furnace resembling externally that used in the glass manufacture, in the base of which, under an arch, are set two horizontal troughs made of fire slabs, each of them from 8 to 15 feet long, and from 26 to 36 inches wide and deep. Bar iron, made from magnetic ores with charcoal, is selected for making the best steel, and the English works are supplied with such iron from Sweden and Russia, the choicest brands being those known as hoop l, Ⓛ; GL, $\overset{G}{L}$; and the double bullet, ∞; all produced from the ores of the famous Danemora mine. These irons are worth in England from £30 to £33 per ton, and, with other irons imported from Sweden, Russia, and Norway, are used in the manufacture of steel to the extent of 35,000 tons annually. The poorer English steel irons, worth £11 per ton, are used to the extent of about 20,000 tons. The bars are cut into lengths somewhat shorter than the troughs, and a bed for them being prepared in these about an inch deep, of pulverized hard wood charcoal mixed with $\frac{1}{15}$ its weight of ashes and a little common salt, the bars are laid in this edgewise, about half an inch apart. The charcoal mixture or "cement" is then sifted over the bars and pressed between them, so that each one is in contact with nothing else. When the bars are covered about an inch deep, another tier is added, each bar over the space between two bars of the bottom layer. The same packing with cement is repeated, and other tiers are added in the same manner, till the chests are filled within 3 inches of the top. This space is then closed in with cement from a previous operation, and covered over either with damp silicious sand or with fire slabs, the joints plastered with fire clay. A complete charge is commonly about 15 tons; some furnaces hold 18 to 20 tons. In the end of the chests some of the bars in the centre are made to project through openings left for the purpose and through the brickwork in front, the object being to draw them out in the course of the process for indicating its progress. The fire is started and gradually increased for the first 24 hours, and after this the heat is kept at about 100° of Wedgwood's pyrometer, necessarily below the fusing point of steel. In 6 days the first examination is made, and in 2 more the bars are commonly found to be converted into blistered steel, so called from the blisters all over its surface, produced it is supposed by the insinuation of carbon beneath scales of the metal imperceptibly united to the mass; it has also been suggested that in the imperfectly welded places oxide of iron is formed, the oxygen of which uniting with the infiltrated carbon produces carbonic oxide and lifts up the metallic scale. The bars gain about $\frac{1}{200}$ in weight and about $\frac{1}{120}$ in length. From the manner in which the carbon is introduced, the steel cannot be homogeneous, but contains most carbon in its outer portions. If soft steel is wanted for springs and saws, the process may be stopped several days sooner than if a higher steel is required, suitable for files, chisels, and other cutting tools. The fire is stopped and the furnace is left for about two weeks to cool before the bars can be taken out. They may then be applied to a variety of ordinary purposes, as some agricultural instruments, table cutlery, coach springs, &c.; but to produce steel of good quality other operations are necessary. What is called shear steel, so named from its having been originally employed in the manufacture of shears for dressing woollen cloth, is made from fagoted pieces of bars of blistered steel, heated to a full welding heat, in which they are protected from oxidation by a coating of very fine clay, and drawn down under the tilt hammer to a bar two inches square, or any other desired size. The tilt hammer for finishing the small bars weighs only from 150 to 200 lbs., and is so constructed as to be worked with great rapidity, striking from 200 to 300 blows a minute, thereby keeping up the heat in the bar through the intense friction produced among the particles of the metal. Heavier hammers are also used, with heads faced with steel and weighing about a ton each. By this operation the steel is much condensed, and rendered of uniform quality and homogeneous structure throughout. Its tenacity, malleability, and ductility are increased, and it becomes susceptible of a high polish. By doubling the bar and repeating the operation the character of the metal is still further improved, and it is then known as double shear steel. The manufacture up to this point is carried on upon an extensive scale in many large establishments in Sheffield, England, and both the blistered and shear steels are sold, to be converted by other manufacturers into the various objects of their operations.—But steel is carried to a still higher degree of perfection by another operation, which converts it into what is known as cast steel. This consists in melting in crucibles the bars of blistered steel, broken in pieces of a pound weight or less. The furnaces, one for each crucible, are partly sunk below the floor of the foundery, and are intensely heated by coke, or in the United States by anthracite. The largest measure about 20 inches by 16, and are 3 feet deep. The crucible, charged the first time used with 36 lbs. of metal, the second time with 32 lbs., and the third and last time with about 30 lbs., is introduced from the top upon the grate bars in the midst of the fuel; and the cover being put on the fire is driven by the strong blast derived from the high chimney, and kept up from 3 to 4 hours. The crucible is then lifted out, and its contents are poured into the cast iron ingot moulds. The ingots are hammered or rolled into bars or sheets, and the steel thus obtained is of the hardest and densest character, requiring much care in forging that it is not hammered at a heat above a cherry red, when it is in danger of being broken to pieces. It is made into bars of various shapes and qualities, and is very largely produced in Sheffield for domestic use and exportation. Great care is taken to insure a uniform quality in each sort of steel sent to market, and also the exact quality suited to the particular use for which the steel is designed. Each ingot is not only examined to insure its uniform character, but it is also appropriated to the special use for which, according to its tenacity and hardness, it is found to be adapted. Many important tools require a particular grade of steel, and constant practice and long experience are necessary to appreciate the differences of quality. But notwithstanding all this care large lots are occasionally returned to the makers by manufacturers in this country, who find the steel ill adapted to their purposes, although from the same houses that have previously supplied them satisfactorily. It is not strange then that consumers are unwilling to incur the risk of trying a new variety, especially when so many instances are before them of failure on the part of novices to produce continuously good steel of uniform quality. Every one therefore who engages in this manufacture does so in the face of serious difficulties, not merely in producing a good article, but in getting it recognized as such, and a sale established for it. The most important improvement introduced of late years in the manufacture resulted from the experiments of Mr. Heath of Sheffield, who sought to produce with English iron steel like that made with the Swedish. The great difference in their qualities, it was thought, might be owing to manganese, which was always present in the Swedish iron. In

1839 he succeeded in producing a carburet of manganese, which caused the English iron to make good steel. He patented the process, but not the improvement he made upon it of using the carbon and manganese separately. This the Sheffield manufacturers adopted, and between 1839 and 1855 it has been estimated that the saving to the buyers of Sheffield cast steel goods by reduced prices in consequence of this invention has been equal to£2,000,000. But Mr. Heath was no more benefited than was Cort for introducing the puddling process; and he died in 1850 poor and broken-hearted.—Among the new processes of making steel, that of Bessemer (see IRON MANUFACTURE, vol. ix. p. 607) has attracted the greatest attention. It appears to be still on probation in Europe, and is spoken of as being tested in works especially built for the purpose in Sheffield. Little is stated as to the cost of the steel made by this process, or of its uniformity of character; but some of the steel produced by it possesses a wonderful tensile power. A bar 3 inches square was bent round until the outer curve was lengthened from 12 to 16¾ inches, and the inner lessened from 12 to 7¼ inches, cold and without a flaw. Four iron rods, 1¼ inches in diameter, were twisted cold into a cable; the rods stretched 1 foot in 4 during the process, and thinned out in inverse proportion. A steel bar 2 inches square was twisted cold into a spiral at an angle of 45°. A round steel bar was hammered cold into the form of a horse shoe. The manufacture of steel by this process is reported to be carried on in several localities in Sweden, especially by Daniel Elfstrand and co. of Edsken; and by Mr. Göranson of Gefle in Sweden large steel circular saw plates have been made from ingots cast direct from the fluid metal within 15 minutes of its leaving the blast furnace. The old firm of James Jackson and son near Bordeaux, France, is also reported to have adopted this process in preference to the manufacture of steel by puddling; and it was also about being adopted at 4 blast furnaces belonging to other establishments in the south of France. In Belgium and Sardinia it was also about being introduced.—What is known as the Uchatius process was introduced in 1856 by Captain Uchatius, engineer of the imperial arsenal at Vienna, and consists in melting in crucibles cast iron reduced to small particles and intimately mixed with some compound of iron and oxygen. Brown spar or the spathose protocarbonate of iron, with some oxide of manganese, was found to be well suited for the purpose. The quantity of oxide is graduated to furnish just the amount of oxygen required. The cast iron is granulated by causing it, as it flows from the blast furnace, to be dashed and scattered by the floats of a wheel from which it falls into cold water, and the smallest pieces are preferred, even such as weigh 1,000 to the pound. The most intimate mixture is thus effected, and the chemical change takes place most readily and thoroughly, resulting in homogeneous steel of the softest quality. As the oxide of iron gives up its oxygen to carry off a portion of the carbon from the cast iron, it is itself reduced to the metallic state, and adds to the quantity of steel obtained, which is thus somewhat greater than of the cast iron employed. The mixture for producing 25 lbs. of steel consists of 24 lbs. of granulated iron, 4 lbs. of spathose ore, 4 lbs. of oxide of manganese, and a little clay. The conversion is completed in 2 to 3 hours, when the steel is poured into the moulds. The method is improved for irons of inferior quality by adding a portion of alkaline earths to the charge, the effect of which is to remove the impurities which readily combine with these as the granules melt.—Other methods of decarbonizing cast iron to the steel point are also practised. One consists in melting together proper proportions of bar and cast iron for the carbon contained in the latter to produce the sort of steel desired, when it is divided throughout the whole of the iron. A patent was granted for it a few years since to G. Brown, of Swinton. He mixes in a crucible small pieces of charcoal, with pieces of bar iron and of pig iron. For a 40 lb. ingot, the proportion of cast iron varies from 7 to 12 lbs., according to the sort of steel, mild or high, required. The great proportion of the charge is necessarily bar iron, and whenever this is to be melted great expense is incurred in crucibles, the best standing only 2 or 3 heats. The best sorts of iron must be employed, there being no provision for separating and removing the noxious elements usually present.—A method of converting malleable iron into steel by fusing it in the presence of an alkaline cyanide, has within a few years past been introduced into practice upon a large scale in the vicinity of New York. For a long time it has been known to workers in steel and iron that the latter might be superficially hardened by fusing upon it the cyanide of potassium; but it was not known that steel might thus be made in the large way until the fact was demonstrated by Prof. A. K. Eaton, who, while lecturing upon chemistry at Little Falls, N. Y., was led to engage in a course of experiments in this direction. He first studied the action of cyanogen, a gaseous compound of carbon and nitrogen, upon incandescent iron; and then of the solid compounds of this gas in the form of the cyanide or ferrocyanide of potassium (prussiate of potash) and cyanide of sodium. He found that iron raised to a bright red heat in a porcelain tube, or otherwise protected, was rapidly and perfectly converted into steel, by passing over it cyanogen gas; also that iron wire introduced into the flame of a burning jet of cyanogen was similarly changed by absorption of carbon. Bars of iron were then packed in fine charcoal with an admixture of yellow prussiate of potash or other cyanide, and at a high temperature these in a surprisingly short time were thoroughly converted into steel. The object of the charcoal is explained by the following *rationale* of the operation: When cyanide of potassium, which consists of two atoms of carbon and one each of nitrogen and potassium, is decomposed at a high temperature in contact with iron by reason of the affinity of its carbon for the iron, the nitrogen would be set free, but that in the presence of ignited carbon and an alkaline base it always will combine with these to produce cyanide of this base. In this case, an atom of potassium being released, all the conditions are favorable for this reaction. Thus the charcoal is added to reproduce the cyanide of potassium as fast as it is decomposed; and the action of this salt is as a carrier to convert the charcoal into the proper condition required for its being taken up by the iron. These and other experiments led to the charging of melting pots with bits of malleable iron and a mixture of cyanide salts and powdered charcoal. After melting, the product turned out into ingot moulds was found to be cast steel, which, by the ordinary method, was then drawn into bars. The process proved to be more expeditious and economical than any before applied to the manufacture of steel. In 1851 and 1852 its practicability was demonstrated upon a large scale, first at Rochester and afterward at New York, and its application to the reduction of iron ores and the production of steel direct from the ore tested. At this stage of the history of the process Prof. Eaton disposed of his interest in it to other parties, who directed their attention wholly to attempts to work by means of it the ores of iron. They neglected to patent the process, and some time afterward application was made and obtained for a patent by an individual who, while the demonstrations were made in New York, had an opportunity of obtaining knowledge of the materials employed. Thus the discoverer and original proprietors lost the exclusive control of this method of making steel. Under the patented process another salt (sal ammoniac) has been used, which, however, can have no effect upon the result, as it volatilizes at a temperature much below that at which the other ingredients of the mixture are affected. The manufacture is now carried on in New Jersey and on Staten island by the owners of the patent; and works are about to be started at Pittsburg. The process, however, is incumbered with the objection that it is necessary to employ the choicest kinds of American bar iron, in order to produce cast steel of a uniform good quality; and to the still more serious difficulty arising from the rapid destruction of the costly melting pots in which the malleable iron is fused. These rarely stand more than two or three meltings, and some only one, before they are rendered worthless. The quality of much of the steel produced is fully equal to the best of English manufacture, so that its use has been adopted in several of the important mines of Lake Superior, where the consumption of steel is very great, and also in numerous quarries and machine shops for the various tools employed.—Processes were afterward invented by Prof. Eaton for converting cast iron into steel, which are particularly applicable to moulded objects, the form of which it is desirable to retain in the condition of steel. The castings adapted to this operation are such as are employed in the ordinary manufacture of malleable iron castings, being prepared from those mixtures of pig iron which produce a silver-white high iron of great hardness, and such fluidity when melted as to take the minutest impressions of the mould. By boiling these in fused carbonate of soda, Prof. Eaton found that the carbon of the cast iron was gradually removed, proceeding from the outside of the articles toward the centre, and that, according to the stage of the operation at which the articles were taken out, they might be obtained in steel of any desired grade of hardness or proportion of carbon, test bars of suitable thickness introduced into the pot with the articles to be converted and taken out from time to time indicating the progress of the operation. Bubbles of carbonic oxide rising through the boiling soda indicate that the process of removing the carbon is still going on. The pot employed is of cast iron, an inch or more thick, and the boiling is kept up for about 70 hours to produce the change throughout a thickness of about an inch. The effect of the carbonate of soda is not merely to combine with and remove the carbon from the iron, but any sulphur, silicon, phosphorus, &c., present are taken up, and the metal is freed from these impurities so detrimental to steel. The process was found well adapted for the rapid production in steel of multiplied copies of the same article, especially of those which by reason of their irregular figures it would be difficult to forge, such as plough points, &c.; while it was also well suited to others, as hoes, shovels, &c., which, being cast in small thick plates and converted, might then be rolled out, the tang properly shaped, and the finish given without the necessity of riveting or welding separate pieces together. Bars of cast iron have also thus been converted into excellent steel and used for cutlery. The forging after converting no doubt has the effect of giving greater diversity to the metal, although the converted steel presents no indications of deficiency in this respect. If necessary, articles cast in the shapes they are to retain may be rendered more dense by compressing them in dies.—Carbonate of soda was found to be much more efficient than the hydrate, and this led to experimenting upon the effect of carbonic acid gas as a decarbonizing agent. In the bottom of a vertical cylindrical retort were placed bits of limestone, above these pieces of cast iron, and from the top proceeded an open tube for the escape of the gases. The retort was so arranged in the fire as to receive the heat chiefly in its middle portion, all that was required at the bottom being enough to slowly expel the carbonic acid from the limestone. When the retort was heated, the gas that escaped proved to be inflammable, burning with the blue flame of carbonic oxide, and was evidently produced at the expense of the carbon of the cast iron, which furnished an atom to each atom of carbonic acid from the limestone. The diminution of the inflammable gas indicated the removal of most of the carbon, and the process being stopped, the cast iron was found to be converted into good steel. To protect delicate castings from being bent at the high temperature required, they are advantageously packed in some coarsely powdered substance; and oxide of iron, such as is used in the ordinary malleable iron process, is especially well suited to this purpose; for, beside accomplishing this object, it readily gives up oxygen to carbonic oxide at high temperatures, converting this back to carbonic acid in twofold quantity, and this is immediately ready to renew its decarbonizing action upon the castings with multiplied effect. By calculation, the quantity of carbonic acid required to decarbonize any amount of cast iron, the composition of which may be assumed as represented by the formula Fe_8C, is as 66 to 690, the latter being the weight of the iron; but if 160 lbs. of peroxide of iron be added, the first effect should be to produce 132 lbs. of carbonic acid, which should decarbonize twice the original amount of cast iron. The following modifications have hence been recommended in the manufacture of steel by the soda process: 1st, the use of the bicarbonate of soda, in place of the simple carbonate; and 2d, the passing of a current of free carbonic acid through or over the bath of melted soda containing the cast iron, in order that the soda may be recarbonated as fast as its carbonic acid is decomposed by the cast iron. Common salt is advantageously added, considerably reducing the bulk of soda required. In case of the process having been carried so far as to render the external portion too soft, Prof. Eaton rehardens this portion by immersing the articles for a short time in a bath of fused prussiate of potash. He finds that merely keeping them at a high temperature in a furnace tends to distribute the carbon they contain uniformly throughout the mass. It is recommended to make use of the final product of carbonic oxide generated in this process, as a reducing agent of the native oxides of iron. For this purpose the gas may be led into a second retort charged with these oxides, and there being reconverted into carbonic acid by its reaction upon the oxide, this gas may be returned to the decarbonizing retort to go again the same round. The use of these processes was secured to Prof. Eaton by patent, June 25, 1861.—The great importance of the manufacture of steel in England is shown by the following statement of its condition in 1853. It is there carried on chiefly in Sheffield and its neighborhood, where there were at that time 160 converting furnaces of a capacity of 800 tons of bar steel per annum, and 1,495 melting holes for cast steel capable of melting, for each furnace of 10 holes, 200 tons. The actual product has been estimated at 40,000 tons of bar steel, producing 23,000 tons of cast steel, 10,000 tons of coach spring steel, and 7,000 tons to be converted into German, fagot, and single and double shear steel. The commercial value of the cast steel varies from £35 to £60 per ton, averaging about £45. The price of the bar steel varies from £28 to £60 per ton, and the rate of £35 per ton, given in the table below, is probably under the average. Coach spring steel is £19 per ton. The whole may then be rated as follows:

23,000 tons of cast steel, all qualities at £45 per ton	£1,035,000
7,000 tons of bar steel, including German, fagot, single and double shear steel, average £35 per ton	245,000
10,000 tons of coach spring steel, £19 per ton	190,000
40,000 tons	£1,470,000

This is somewhat increased by the other operations carried on at Newcastle and in Staffordshire. The production of other countries is stated in the following table, which we take from the new edition of "Ure's Dictionary" edited by Robert Hunt:

Countries.	Tons.	Average value.
France	14,954	£443,850
Prussia	5,458	170,824
Austria	13,037	321,073
The United States	10,000	212,500

Concerning the production in the United States no correct statistics have been collected, and the estimate just named can certainly not be applied to steel of original manufacture. There are many small establishments in Pittsburg, Philadelphia, New Jersey, and New York, in which scrap steel is remelted, and some cementation steel is produced at a few places in different parts of the country for the use of those who manufacture it; but American cast steel is hardly known in the markets. The Adirondac manufacture noticed in ADIRONDAC MOUNTAINS has ceased, and some others also in New Jersey. Some cast steel is, however, made in the works in Jersey City; and at Rockaway, N. J., it is produced to the extent of about a ton a day. In Connecticut also there is a manufactory of about the same capacity. There is one establishment in operation on Staten island, N. Y., which made about 800 tons of steel in 1861, and has a capacity of production somewhat larger. There is another, also employing the cyanide process, at Pittsburg, Penn., and making 500 tons or more per annum. Thus the total production of cast steel appears not to exceed 2,000 tons; and that of blistered steel, to be used without melting, is probably not much more. The great abundance of ores which we possess, as well adapted for this manufacture as those of Sweden and Norway, must ere long render us independent of all foreign competition in the production of this important article. The importations of steel into the United States, not including cutlery and saws, were as follows for the years ending June 30, 1859, and June 30, 1860:

Whence imported.	1859.				1860.			
	Cast, shear, and German.		All other.		Cast, shear, and German.		All other.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
Sweden and Norway	297	$1,155	....	....	1,008	$8,881	....	....
Danish West Indies	....	....	....	....	85	799	....	....
Hamburg	5	61	2	$29	80	810	....	....
Bremen	1,704	16,566	....	....	1,442	18,575	....	....
Holland	1,680	18,957	390	1,969	2,658	21,369	....	....
Belgium	158	1,886	599	2,725	....	....	....	....
England	121,905	1,081,477	154,058	900,249	158,794	1,441,802	234,121	$1,185,793
Scotland	288	944	....	....	....	....	....	....
British N. A. possessions	49	684	10	70	81	234	64	393
British West Indies	....	....	117	817	....	....	....	....
France	....	....	....	....	14	182	81	218
Sardinia	290	3,067	....	....	289	2,228	....	....
Austria	2,601	22,205	....	....	5,097	44,688	1,158	7,117
Mexico	65	369	....	....	177	1,879	....	....
Total	128,937	$1,141,871	155,171	$905,859	164,615	$1,580,897	235,369	$1,193,456

—Although England exceeds all other countries in its production of steel, the largest manufactory in the world is probably that of F. Krupp of Essen, in Rhenish Prussia. It is situated in the midst of coal mines, and covers with its buildings and yards a space of 1,600 by 1,800 feet; the roofs of the buildings cover 20 acres. It employs 2,300 to 2,500 men, and consumes more than 200 tons of coal each day, and 49,000 feet of gas for lighting the works. The process employed has not been made public; but the products have attracted great attention in Europe, from their unparalleled size. They consist of steel cannon, steamboat and other shafts, railroad axles and tires, and machinery, rolls for mints, &c. At the Paris exhibition of 1855 there was a mass of steel from these works of 10,000 lbs. weight, and another piece has been produced of 20,000 lbs. weight. A steel shaft for a French steamer was made 30 feet long, at a cost of $6,000. The largest casting made is of 40 tons weight, but the works are competent to make much heavier ones. Of the steel car axles it is reported that Mr. Krupp pledges himself to pay $10,500 if any that he sells breaks within 10 years. The heaviest hammer weighs 40 tons. A steel cannon is to be exhibited in London in 1862 of 10-inch bore, the casting of which requires the labor of 1,250 men in pouring the metal into the mould. Many steel cannon have been produced for the European governments, and three small ones have been sent to this country for the city of Philadelphia. The manufacture of cannon from puddled steel was commenced in New York in 1861 on the plans devised by Mr. Norman Wiard, and the first piece was completed and ready for service on July 1; since which time many more, chiefly 6 and 12-pounders, with some 50-pounders, have been completed, and have done efficient service in the campaigns in the South and West. The steel is puddled at the rolling mills in Troy, N. Y., and Trenton, N. J., the process being stopped at the point when sufficient carbon remains in the metal to give it the steely character. The metal is then hammered into blooms, and is taken to New York, where it is forged in the works of Messrs. Tugnot and Dally; after which the solid pieces are bored and rifled by Messrs. Plass and co. The largest gun made up to April, 1861, is of 5.1 inches caliber, and weighs 6,000 lbs. Pieces found defective on trial tests are only about one to the hundred. The tensile strength of the steel is said to be equal to a strain of from 107,000 to 118,000 lbs. to the square inch.

—Many of the applications of steel to useful purposes have been incidentally alluded to in the course of the present article. These are very numerous, and are constantly increasing, as the methods of manufacture are improved. When produced in a small way by imperfect and difficult processes, its use was confined to cutting tools and important instruments that required great hardness, strength, or elasticity. In many its use was economized by making only the part subjected to wear of steel, and welding this to iron; and the practice is still retained to some extent, as in axes and other heavy tools; while in others, as the drills and hammers which consume immense quantities of steel in mining and various manufacturing operations, it has been found more advantageous, at least in the United States, to use cast steel exclusively. Its applications to cutlery are quite as successfully conducted in this country as in any part of the world. But for the material itself we are chiefly dependent upon Great Britain; also for the plates used for saws and steel pens, as noticed in the articles on these subjects. Plates for engraving require an excellent variety of steel specially prepared for this purpose. Springs of all sizes, from the hair springs of watches to the heaviest used upon steam carriages (see SPRING), consume it in large quantities. Steel wire is made to some extent for springs, musical instruments, needles, &c. Having about three times the strength of iron wire of the same size, it is advantageously employed for making ropes for special purposes. The application of steel to cannon is of great importance from the large saving in weight over cast or wrought iron compatible with the same strength. This branch is yet in its infancy, and is carried on to any extent only at the works of Mr. Krupp at Essen. The same may be said of car axles, shafts for steamboats, &c. The sonorousness of steel renders it a suitable material for bells; some of large size have been made in England, one of which is in use at San Francisco, California. For the effect of tungsten in combination with steel, see TUNGSTEN.

STEEL ENGRAVING. See ENGRAVING.

STEELE, a S. E. co. of Minnesota, drained by the Lester river and branches of Cannon river; area, 432 sq. m.; pop. in 1860, 2,863. The surface is undulating, diversified by prairie and strips of forest, and the soil fertile. There are 3 or 4 small lakes and a number of fine streams of water. In 1859 there were 32 schools. It is on the line of the projected Transit railroad. Capital, Owatonia.

STEELE, SIR RICHARD, a British author born in Dublin in 1675, died at Llangunnor near Caermarthen, Wales, Sept. 1, 1729. His father was secretary to the duke of Ormond, lord lieutenant of Ireland, and through the influence of that nobleman young Steele received his early education at the Charterhouse, where his intimacy with Joseph Addison was formed. In 1692 he entered Merton college, Oxford, but left at the expiration of 3 years without taking a degree, in the hope of obtaining a commission in the army. His friends discountenanced the idea, and a relative in Ireland, who had named him heir to a large estate, threatened to disinherit him if he carried it into effect; but Steele, having made up his mind to be a soldier, enlisted as a private in the horse guards, and was accordingly disinherited. His genial humor and ceaseless flow of animal spirits made him a general favorite, and he was promoted to a cornetcy, and subsequently to a captaincy in Lucas's fusileers, the latter appointment being due to his colonel, Lord Cutts, to whom he had dedicated "The Christian Hero" (1701), a little book written when the author was "deep in debt, in drink, and in all the follies of the town," to strengthen his mind in habits of religion and virtue. In odd contrast to this work appeared in the succeeding year his comedy of "The Funeral, or Grief à la Mode," which had great success, and was followed by "The Tender Husband" and "The Lying Lover." The latter, as Steele some years later informed the house of commons, was "damned for its piety;" but the author, who had by this time become a fashionable man upon town, readily turned his talents into other channels, and for many years wrote nothing more for the stage. He took his place among the wits of Queen Anne's reign, was appointed gazetteer and gentleman usher to Prince George of Denmark, and, with ample means derived from two marriages, the second of which took place in 1707, he lived constantly beyond his income, was often in pressing need of money, and never free from fear of the bailiffs. Amid the most reckless dissipation, he was invariably good-natured and amiable, and his follies were usually succeeded by severe contrition, which however would not prevent him from transgressing as deeply the next day. His life, in fact, as he has himself expressed it, was passed in "sinning and repenting." Availing himself of the hint afforded by Defoe's tri-weekly paper, the "Review," he commenced in 1709 the "Tatler," for which Addison furnished many of the leading papers, though by no means so many as Steele, whom he now assisted to the appointment of a commissioner of the stamp office. With the overthrow of the whigs in 1710 he lost his office of gazetteer, and with it the means of supplying the items of official news which at first formed an important feature in the "Tatler." This paper was accordingly succeeded in 1711 by the "Spectator," written chiefly by Steele and Addison, and subsequently by the "Guardian," begun and ended in 1713, and a variety of similar periodicals, some of which enjoyed but a brief existence. In 1713 Steele was led, through dissatisfaction with ministerial measures, to resign his office, and was returned to parliament from the borough of Stockbridge, in Hampshire; but having been arraigned before the bar of the house of commons for writing articles in the "Crisis" and the "Englishman," "maliciously insinuating that the Protestant succession in the house of Hanover was in danger under her majesty's administration," he was adjudged to be guilty of a scandalous libel, and was expelled by a vote of 245 to 152—the whole proceeding being, according to Lord Mahon, "a most fierce and unwarrantable stretch of party violence." His pen, however, continued to be actively employed in the whig interest, and upon the accession of George I. he received several profitable appointments, including that of governor of the royal company of comedians, was knighted by the king, and elected to parliament from Boroughbridge. No accession of means however seemed to better his fortunes, and while holding half a dozen offices, and commanding the admiration of the town by his talents, he was frequently reduced to the most pitiable pecuniary shifts. Having opposed the court measure for fixing permanently the number of peers, he was deprived by the lord chamberlain of his license for acting plays, whereby, according to his own account, he sustained a loss of nearly £10,000. In 1721 he was reinstated in his office, and produced in the succeeding year his last and best comedy, "The Conscious Lovers," which proved completely successful, and brought him in ample receipts. He was nevertheless reduced soon after to the necessity of selling his share in the playhouse in Drury Lane, the proceeds of which were speedily consumed by extravagance and an unsuccessful lawsuit with the managers. At this juncture a paralytic attack rendered him incapable of further literary labor, and he retired to a small estate near Caermarthen in Wales, left him by his second wife, where he died almost forgotten by his contemporaries, having "outlived his places, his schemes, his wife, his income, his health, and almost every thing but his kind heart." Although the fame of Steele as an essayist is somewhat overshadowed by that of his literary coadjutor, Addison, he possessed perhaps the more fertile imagination of the two, and is entitled to the credit of having first conceived the characters of Sir Roger de Coverley, Will Honeycomb, and others of the Spectator club, which received their finishing touches from the hand of Addison. He was distinguished by a chivalric admiration of women, and his letters to his wife, about 400 in number, form one of the most singular correspondences ever published. There is an elaborate treatise on the character and genius of Steele in Forster's "Historical and Biographical Essays" (2 vols., London, 1858); and Thackeray, in his "Lectures on the English Humorists," has treated the same subject at length. The writings of Steele have never been collected.

STEELYARD. See **Balance**.

STEEN, **Jan**, a Dutch painter, born in Leyden in 1636, died in 1689. He early rose into great reputation as a humorous painter, throughout life was addicted to good living, and is even said to have opened a public tavern. His pictures represent merrymakings, card parties, tavern interiors, alchemists' laboratories, schools, sick rooms, &c. According to Kugler he was almost the only artist of the Netherlands who brought into full play all the elements of genuine low comedy. Fine specimens of his powers are to be found in private collections in England, but the greatest number of his works are in the museums of the Hague and Amsterdam. That of the Hague contains the well known picture entitled a "Representation of Human Life." He painted in all about 800 pictures.

STEERING APPARATUS, the appliances by which vessels are guided through the water. The earliest method was by a long oar passed out of the stern. Sometimes more than one were used for this purpose, as is seen in the drawings of some of the ships of the ancient Egyptians. An oar is a very efficient means of steering boats, and is still employed on such as often require sudden turning or the exertion of considerable force to bring the boat round, as on some canal boats, whale boats, rafts, &c. The principle of the rudder is explained in the acticle **Ship**, vol. xiv. p. 601. The head of the rudder, projecting above the deck, is furnished with a horizontal handle or lever called the tiller, by which the rudder is turned. The term helm is often applied to this, as also to the rudder and tiller together. As by reason of the motion of a vessel through the water a powerful force is exerted to keep the rudder on a line with the keel, and as by the shock of the waves the rudder is sometimes violently thrust to one side or the other, it becomes necessary on small vessels to steady the tiller by a rope made fast to the weather side of the vessel, and one end held with a turn around the tiller. A block and tackle are required for vessels of larger size, replaced upon still larger ones by "the wheel." This is a wheel and axle set upon the tiller, the rope of which, making several turns round the axle, is carried toward each side of the ship, so that the turning of the axle draws the tiller toward that side the rope of which is being wound up. The handles for working the wheel appear as spokes extended beyond the periphery. About the year 1802 boats were used on the Forth and Clyde canal with the steering wheel fixed forward and connected with the rudder by ropes, chains, or rods. Though this plan did not continue in use in Europe, it necessarily followed the construction in the United States of the long river steamers, the decks of which are obstructed with cabins and machinery, and the wheel has been set in these in the most conspicuous place forward, in a sort of tower called the pilot house. In consequence of serious disasters having occurred from the ropes leading to the rudder being burned in case of fire, it is now made a law that chains or iron rods shall be used for this purpose. Large vessels require several men at the wheel in rough weather; and the very largest appear to have fallen short of due efficiency in their steering apparatus, and of the necessary power for working it. Steam engines specially devoted to this work may yet be found indispensable. By the use of 2 screw propellers, one each side the rudder, it is found by Mr. Edwin A. Stevens of Hoboken, N. J., that when these are worked in opposite directions the vessel may be turned on its centre as a pivot, and he has adopted this plan, which is the most efficient steering apparatus known, for the "Stevens battery." (See **Battery**, and **Ship**.)

STEEVENS, **George**, an English author and Shakespearian editor, born at Stepney in 1736, died at Hampstead in Jan. 1800. He was educated at Eton and at King's college, Cambridge. His first publication, a reprint of "Twenty of the Plays of Shakespeare, being the whole Number printed in Quarto during his Lifetime" (4 vols. 8vo., 1766), contained, in addition to a faithful reprint of the original text, a variety of readings from other quarto editions, given in the foot notes; and the reputation which he thereby acquired led to his association with Johnson in the preparation of the edition of Shakespeare which was published in 1773 with their joint names. Their 2d edition appeared in 1778, and two years later Malone, who had rendered Johnson and Steevens some assistance in its preparation, published a supplement containing the doubtful plays and the poems. Steevens, who regarded this almost in the light of a challenge, immediately set to work upon a new edition of Shakespeare, which occupied him, in conjunction with Isaac Reed, incessantly during the next 12 years. Disregarding the principles which had guided his former labors, he aimed at preparing a text which, "instead of a timid and servile adherence to ancient copies," should be distinguished by the "expulsion of useless and supernumerary syllables, and an occasional supply of such as might fortuitously have been omitted.” The edition was published in 1793 in 15 vols., and until the appearance of that of Knight in 1838 maintained its reputation as the standard text, although in the edition of Malone, published posthumously by Boswell in 1821, some attempts were made to adhere to the early copies. Steevens's remaining productions are of little importance, if we except his anonymous contributions to the “St. James's Chronicle” and the “Critical Review,” in which he attacked many of his literary contemporaries, for whom in private he professed admiration and esteem, in language surcharged with biting sarcasm. He was characterized by Johnson as “mischievous” rather than malignant. He appears in a less amiable light when foisting upon the mock commentators, Amner and Collins (names invented by himself), annotations he was ashamed to acknowledge as his own; or when appending the name of his rival, Malone, to a bitter attack upon Capell.

STEFFENS, Henrik, a German author, born at Stavanger, Norway, May 2, 1773, died in Berlin, Feb. 13, 1845. He studied theology at Copenhagen, then devoted himself to the natural sciences, and became a disciple of Schelling. He was intrusted in 1800 with the revision of Schelling's writings on the philosophy of nature. He soon after enjoyed at Freiburg the friendship and instruction of Werner, and wrote his *Geognostisch-geologische Aufsätze*, afterward expanded in his *Handbuch der Oryktognosie* (3 vols., Halle, 1811–'19), in which nature is considered historically as a spiritual force representing itself in time. He lectured with applause in Copenhagen in 1802; accepted a professorship at Halle in 1804, where he wrote his *Grundzüge der philosophischen Naturwissenschaft* (Berlin, 1806); lived with friends in Holstein, Hamburg, and Lübeck from 1807 to 1809; was involved at Halle in the dangerous schemes of Prussian patriots for throwing off the French yoke; went to Breslau in 1811, where his addresses animated the people and especially the students in the war against Napoleon; and, having volunteered in the army, marched with it to Paris. He returned to Breslau, where he held the chair of physics and of the philosophy of nature, till in 1831 he was called to a similar professorship in Berlin. According to Michelet, “the totality of the school of Schelling is most manifestly set forth in his writings.” In his *Anthropologie* (2 vols., Breslau, 1822) he carried abstract philosophy into the domain of physiology, treating the constitution of human nature in its relation to that of the universe. He discussed practical questions and the philosophy of politics and society in *Ueber die Idee der Universitäten* (1809), *Die gegenwärtige Zeit und wie sie geworden* (2 vols., 1817), and especially the *Caricaturen des Heiligsten* (2 vols., 1819–'21). He opposed in the interest of a philosophical pietism the evangelical union, and published the polemical treatise *Von der falschen Theologie und dem wahren Glauben* (1824), and the confession of faith *Wie ich wieder Lutheraner wurde* (1831). He embodied his reminiscences in a series of novels, *Walseth und Leith* (1827), *Die vier Norweger* (1828), *Malcolm* (1831), and *Die Revolution* (1837). His heroes are chiefly Scandinavians, who travel southward, become involved in the events of the French revolution and in German theories, and bestow their admiration in turn upon the worship of genius, Moravian piety, Prussian heroism, Schelling's philosophy, and Werner's geology. His last work was an autobiography, *Was ich erlebte* (10 vols., 1840–'45). His *Nachgelassene Schriften* appeared with a preface by Schelling in 1846.

STEIN, Christian Gottfried Daniel, a German geographer, born in Leipsic, Oct. 14, 1771, died in Berlin, June 14, 1830. He was educated at the university of Leipsic, studied theology, but gave special attention to geography and statistics, and in 1795 became teacher of those branches at the gymnasium of the Gray-friars in Berlin, with which he was connected during the remainder of his life. His works, geographical, historical, and statistical, for schools, including an “Atlas of the Whole World” (25th ed., Leipsic, 1850), have obtained a wide popularity.

STEIN, Karl, baron von. See Altenstein.

STEIN, Ludwig, a German political economist, born in Eckernförde, Schleswig, Nov. 15, 1813. He was the child of poor parents, and was educated at the expense of Frederic VI. of Denmark. His first work was a “History of Civil Process in Denmark” (Kiel, 1841); his second, *Der Socialismus und Communismus des heutigen Frankreich* (Leipsic, 1844), of which a 2d edition, remodelled and considerably enlarged, has appeared under the title of *Geschichte der socialen Bewegung in Frankreich von* 1789 *bis auf unsere Tage* (3 vols., Leipsic, 1849–'51). He has also published *Französische Staats- und Rechtsgeschichte* (3 vols., Basel, 1846–'8). In 1846 he was appointed professor of law in the university of Kiel, and joined in a protest against the threatened infringement of the rights of Schleswig by the Danish crown. In 1848 he was appointed by the provisional government of Schleswig envoy to Paris. Having been deprived of his professorship, he received the chair of political economy in the university of Vienna, where he has since resided. He is now engaged upon a comprehensive work entitled *System der Staatswissenschaften*. He is a zealous free-trader.

STELLIO (Daud.), a genus of iguanian lizards, characterized by a triangular, flattened head, covered with numerous small spinous plates; body depressed, the scales having intermixed some larger and rougher plates; a longitudinal fold on each side between the legs; no femoral pores, and no dorsal or caudal crest; anal pores distinct; tail with large keeled and spiny scales arranged in whorls; incisors 4 above, canines 2 above and none below, and cheek teeth triangular; no teeth on palate; tongue thick and fleshy. The common stellio

(*S. vulgaris*, Daud.), the *lacerta stellio* of Linnæus, the *hardun* of the Arabs, is about a foot long, of which the tail is not quite one half; the color is olive, shaded and spotted with black above and olive yellow below. It is common in the Levant, and especially in Egypt, where its excrements were formerly collected and used in making cosmetics; it is a very active animal, feeding on insects, and living in ruins, clefts of rocks, and holes in the ground. According to Cuvier, Mohammedans always kill it, thinking that it purposely insults them by bowing its head in imitation of their motions during prayers. The *stellio* of the ancients was undoubtedly a species of gecko, and probably the *Pt. Hasselquistii* (Dum. & Bibr.). (See GECKO, vol. viii. p. 119.)

STENDHAL. See BEYLE.

STENOGRAPHY, a method of abbreviating ordinary writing by the use of signs, now almost universally superseded by phonography or phonetic shorthand. (See PHONOGRAPHY.) Some writers assert that Xenophon used it for reporting the conversations of Socrates, but it is uncertain whether any system had been invented prior to the time of Cicero, whose freedman Tiro is said to have by this means reported some of Cato's speeches. It was extensively practised during the early period of the Roman empire, but was entirely abandoned in the dark ages. In England the first attempt at stenographic writing dates from 1602, at which time John Willis's alphabetic system was published, though a system of characters representing words had appeared in 1588, invented by Timothy Bright. Several other writers followed Willis, the most famous of whom was Rich, whose system, amended by Dr. Doddridge, has come down to our own time. In 1682 Mason published a better and simpler alphabet, which was the most popular for a century. Its modification by Thomas Gurney (1753), known as Gurney's shorthand, has been employed by his descendants as parliamentary reporters up to the present day. The systems of Byrom (1767), Taylor (1786), Mavor (1789), and Lewis (1815) have each had their advocates, and were in general use till 1837, when Pitman's phonography was published. About 100 works were issued on the subject in England between 1602 and 1830. In France, Conin de Perpeau's *Sténographie* and Grosselin's *Vocabulaire sténographique* were the most popular systems. The fundamental principle of these various systems, differ as they might in other respects, was that they represented, by the position of their characters, every letter of the alphabet, and the additional sounds of the double consonants *ch*, *sh*, *th*, &c., while phonography deals only with the actual sounds, and analyzes these, arranging them according to their mutual relations. The shorthand writers had also characters to represent prepositions and terminations, arbitrary signs to indicate words of frequent recurrence, and other methods of abbreviation, by omissions and the like.

STENTOR, a Grecian herald in the Trojan war. Homer describes him as "great-hearted, brazen-voiced Stentor, who was accustomed to shout as loud as 50 other men." Hence the name has been applied proverbially to loud-voiced persons.

STEPHANUS OF BYZANTIUM, the author of the geographical lexicon called Ἐθνικά, flourished probably in the beginning of the 6th century. There is scarcely another ancient author of whom so little is known, neither the age in which he lived nor any incidents of his life having been preserved; and his work, probably the earliest dictionary of geography ever written, exists only in an abridgment made by Hermolaus. A few fragments of the original are still extant. The title of the work has been made a subject of controversy. The original dictionary was full of valuable material for the history of ancient places and of quotations from ancient writers. There have been numerous editions of the epitome, of which the most useful is that of A. Westermann (8vo., Leipsic, 1839). It has been translated into German by S. C. Schirlitz.

STEPHEN, SAINT, the first martyr of the Christian church. He was, as appears from his name, a Hellenist by birth, and one of the 7 deacons in the Christian congregation of Jerusalem, who, upon the complaint of the Hellenists that their widows were neglected, had been chosen by order of the apostles to superintend every thing connected with the relief of the poor. The Jews charged him with having spoken against the law and the temple, against Moses, and against God, and by order of the sanhedrim he was stoned. Before his death he addressed his persecutors at length, and he died praying that those who put him to death might be forgiven. (Acts vi. and vii.) No information is given respecting the time of his death, but it is believed to have been in the year 36 or 37. He is annually commemorated by the Roman Catholic church on Dec. 26.

STEPHEN, the 4th king of England of the Anglo-Norman line, born in 1105, died Oct. 25, 1154. His father was Stephen, count of Blois, and his mother was Adela, or Adelicia, the 4th or 5th daughter of William the Conqueror; and Stephen was their 3d son and 6th child. He early became a favorite of Henry I., his maternal uncle, who knighted him in his youth, and gave him the earldom of Mortagne in Normandy, beside bestowing upon him several valuable estates in England. He procured his marriage to Matilda, heiress to the count of Boulogne, as early as 1114, by which Stephen became possessed of that title and property. When, in 1120, William, the heir of Henry I., and so many other members of the king's family and household, were lost by the foundering of the White ship, Stephen was saved from the same fate by leaving the vessel in consequence of finding that she was too crowded for safety. Henry employed him in various ways, and never abated his attachment to him, which originated in the circumstance that Adela, Stephen's mother, had been the king's most attached sister, rendering him important services when it was not supposed that he would ever reign. She had recommended her son, who was then a child, to her brother's protection, and Henry accepted and discharged the trust. Stephen was the second person of the laity who took the oath to support Henry's daughter, the empress, as queen of England and duchess of Normandy, should her father die without issue male. This oath was not thought to be binding, as it was not possible for a woman to discharge the duties of the kingly office according to feudal ideas of those duties, the most prominent regal attribute being command in war. The widowed empress, too, had married a Frenchman—Geoffrey Plantagenet, count of Anjou—and the marriage was in direct violation of the king's assurance, which was thought to have cancelled the obligation on the other side. It is asserted that Henry changed his mind just before his death, and released those who had sworn to support Matilda from their oath. Theobald, count of Blois, Stephen's eldest brother, was regarded by many Normans as the proper person to succeed Henry; but while they were deliberating, Stephen had hastened to England, and had there been crowned, Dec. 22, 1135. The archbishop of Canterbury believed that Henry had expressed an intention to leave his dominions to Stephen, whom the people loved because of his popular manners. He was, says Lappenberg, "distinguished for kindness, courtly manners, an amiable serenity of character, and a condescension which had long gained him the hearts of many among all conditions of people. On the other hand, he often proved himself imprudent and rash, and on his fairest promises no reliance could be placed. In short, he exhibited, in all its traits, a complete specimen of the accomplished Norman knight of those days, who, although capable of enacting many parts excellently well, was nevertheless but ill qualified to rule over a kingdom." Stephen confirmed to the English the immunities and good laws of Henry I., and also the laws and customs of Edward the Confessor. He obtained peace with Scotland by making cessions to King David, from whom he obtained acknowledgment and homage. At a meeting of barons and prelates at Oxford, he produced a letter from the pope expressing approval of his election to the throne. A charter was framed, by which the old privileges of all classes were confirmed, and certain abuses that had happened in the preceding reign were removed. The reign of Stephen was a period of constant war and tumult. He was involved in contests with the Welsh, who inflicted defeat and loss on the Normans. In the war that was renewed with Scotland in 1138, the English gained the great battle of the standard, Aug. 22. Revolts broke out, at different times, in various parts of the country. The cause of the empress Matilda was early taken up by a party in England, headed by her natural brother Robert, earl of Gloucester; and on Sept. 30, 1139, Matilda landed in England. The war was waged with various fortune, but Stephen was defeated and made prisoner, Feb. 2, 1141, at the battle of Lincoln. The greater portion of the country submitted to the victors; but Matilda's arrogance was so offensive that a reaction speedily took place. Her brother was defeated and captured in Sept. 1141, and was exchanged for Stephen. At the battle of Wilton, July 1, 1143, Gloucester was victorious, and the king preserved his freedom only by flight. The war raged for years, and the condition of England was made most deplorable. In 1153 Henry, son of the empress Matilda, arrived in England at the head of a considerable force, and defeated Stephen at Malmesbury. He was about to prosecute his advantages, when the leading men on both sides interposed to bring about a peace. This was found a less difficult task than had been anticipated, in consequence of the sudden death of the king's eldest son, Eustace. By the treaty of Winchester, Nov. 7, 1153, it was settled that Stephen should remain king of England for life, and that he should be succeeded by Henry; and that Stephen's son William should retain all his possessions acquired by marriage or otherwise, and all those which his father had held in Normandy, England, and elsewhere, before he became king. Stephen did not survive the making of this treaty quite one year, dying after a brief illness. His reign was the most miserable time ever known in England. The country was covered with castles, many hundreds of which were erected at this period; and it was devastated by the foreign soldiery, the king himself employing numerous mercenaries, principally from Flanders and Brittany. Stephen was the last of the Anglo-Norman kings of England, the throne passing on his death to the house of Plantagenet, in the person of Henry II.

STEPHEN I., king of Hungary. See HUNGARY, vol. ix. p. 357.

STEPHEN, king of Poland. See POLAND, vol. xiii. p. 430.

STEPHEN, SIR JAMES, a British statesman and author, born in London in 1789, died in Coblentz, Sept. 15, 1859. He was graduated at Trinity hall, Cambridge, in 1812, and soon after called to the bar at Lincoln's Inn. He was appointed counsel in the colonial department of the public service, and in 1824 counsel to the board of trade. He held both offices until 1834, when he was promoted to be assistant under secretary. He was subsequently made permanent under secretary, and retired from office in 1847, when he was knighted. In 1849 he was elected regius professor of modern history in the university of Cambridge, an appointment which he held at the time of his death. For a number of years he was an active contributor to the "Edinburgh Review;"

and a collection of "Essays on Ecclesiastical Biography," first published in that periodical, has passed through several editions. He also published his collegiate course of "Lectures on the History of France" (2 vols., 1851), of which 8 editions have appeared, and some occasional lectures. A memoir of him is in preparation by his son Fitzjames Stephen.

STEPHENS, or Stephanus (Fr. *Estienne* or *Étienne*), the name of a French family of printers who flourished during the 16th and 17th centuries. Henry, the founder of the family (born in Paris about 1460, died in 1520), established a printing house in Paris in 1502. He published mathematical and theological works, distinguished for the accuracy with which they were printed. His 3 sons, Francois, Robert (born in Paris in 1503, died in Geneva in 1559), and Charles (born in Paris in 1504 or 1505, died in 1564), were largely engaged in printing. Robert, a man of great learning and industry, in his 20th year published an edition of the Latin New Testament, with some corrections by himself which excited the hostility of the doctors of the Sorbonne. At his house, which was the resort of the most eminent literary men of the day, Latin was the ordinary language of conversation, even among the children and servants, to whom it was taught by his wife, a woman of rare accomplishments. For many years scarcely a month passed in which some work, generally edited and corrected by himself, did not issue from his press. He is said to have publicly posted proof sheets of his works, with the offer of a premium for the detection of errors. In 1531 he began the publication of his *Dictionarium, seu Thesaurus Linguæ Latinæ*, which he successively improved in 2 subsequent editions. His editions of the Bible and notes brought him into trouble with the Sorbonne, from which however he was protected during the life of Francis I., who had appointed him royal printer. After the king's death the Sorbonne caused the sale of his Bibles to be prohibited, and to insure his safety the printer retired to Geneva, where he died, it is said, in the Calvinistic faith. He published at least 11 complete editions of the Bible, in Hebrew, Greek, Latin, and French, beside many separate editions of the New Testament; and 382 other works, mostly of the first importance, came from his press. He first introduced the existing division of the New Testament into verses. Charles, the younger brother of Robert, devoted himself to physical sciences, and for some years practised medicine. He succeeded to his brother's business when the latter retired to Geneva, and was subsequently appointed printer to Henry II. His publications, scientific and classical, are numerous.—Henry, son of Robert (born in Paris in 1528, died in 1598), was esteemed one of the most learned men of his time. He spoke Latin with fluency while a child, and throughout his life was a profound student of Greek literature. His establishments were successively in Paris and Geneva; but after the publication of his great work, the *Thesaurus Linguæ Græcæ*, the costliness of which confined it to a limited number of purchasers and involved the printer in pecuniary embarrassments, he led a nomadic life, travelling from city to city, exploring libraries, and collecting an immense amount of material for works which he was projecting, and which he published wherever he happened to be.—Among others of the family were Paul, son of the preceding (born in Geneva in 1566, died there in 1627), who succeeded his father in the management of the printing establishment at Geneva, which he conducted for many years; and Anthony his son (born in Geneva in 1592, died at the Hôtel Dieu in Paris in 1674), who for 50 years conducted a printing house in Paris with much energy, but died in great poverty.

STEPHENS, Alexander H., an American statesman, born in Taliaferro co., Ga., Feb. 11, 1812. He was graduated at Franklin college, Athens, Ga., in 1832, studied law, was admitted to the bar in 1834, and rapidly obtained a large and lucrative practice at Crawfordsville. In 1836 he was elected a member of the lower house in the legislature of Georgia, was reëlected for 5 successive terms, and exerted himself with success to secure legislative aid for the system of internal improvements. In 1839 he was a delegate to the commercial convention at Charleston, S. C., and defended the measures proposed by the Georgia delegates against the assaults of those from South Carolina; and in 1842 he was elected to the state senate, where he actively sustained the measures of the whig party. In 1843 he was elected to congress by over 3,000 majority, though his party had previously been in a minority of more than 2,000, and held his seat till 1859. He supported Mr. Clay for the presidency in 1844, though differing from him on the question of the annexation of Texas, in favor of which he made one of his earliest speeches during his first term in congress. The authorship of the resolutions for its annexation was indeed due to him, conjointly with the Hon. Milton Brown of Tennessee. In Feb. 1847, he submitted a series of resolutions in relation to the Mexican war, which afterward formed the platform of the whig party. He opposed the Clayton compromise in 1848, and took a leading part in effecting the adjustment known as the compromises of 1850. The passage of the Kansas and Nebraska act of 1854 in the house of representatives was in great measure due to his efforts, as chairman of the committee on territories. After the breaking up of the whig party Mr. Stephens united with the democrats, and was a prominent champion of the measures of Mr. Buchanan's administration. At the close of the 35th congress Mr. Stephens declined to be again a candidate. During the presidential canvass of 1860 he sustained Messrs. Douglas and Johnson, and in numerous public addresses denounced those who advocated a dissolution of the Union in case of Mr.

Lincoln's election, and in an address before the state convention called after that event vigorously opposed the secession of Georgia. On Feb. 9, 1861, he was nevertheless elected by the confederate congress at Montgomery, Ala., provisional vice-president of the confederate states, and was inaugurated on the 18th of the same month. On April 22 he made a speech at Richmond, Va., in justification of the secession movement, and in July visited the principal cities of the southern seaboard states to urge the taking of the cotton loan. In November he was elected permanent vice-president of the southern confederacy.

STEPHENS, Ann Sophia (Winterbotham), an American authoress, born in Derby, Conn., in 1813. She was married in 1832 to Edward Stephens of Plymouth, Mass., and in 1835 commenced her literary career as editress of the "Portland Magazine" and the "Portland Sketch Book," of which city her husband had become a resident. In 1837 she removed to New York, and soon became an active contributor to the "Ladies' Companion," "Graham's Magazine," and a variety of similar periodicals, in which occupation she has continued to the present time. Her most elaborate work, "Fashion and Famine" (New York, 1854), has had considerable popularity at home and abroad, having appeared in three French versions in Paris. Among her other works are "Mary Derwent," which gained a prize of $400 offered by one of the periodicals; the "Heiress of Greenhurst," "The Old Homestead," and two books on needlework. She has been the editress of several literary magazines, for which she has written much in verse, but has published no collection of her poems.

STEPHENS, John Lloyd, an American traveller and author, born in Shrewsbury, N. J., Nov. 28, 1805, died in New York, Oct. 10, 1852. He was graduated at Columbia college, New York, in 1822, studied law, and practised his profession in New York for 8 years. He then spent two years in foreign travel, and in 1837 published his "Incidents of Travel in Egypt, Arabia Petræa, and the Holy Land," followed in the succeeding year by "Incidents of Travel in Greece, Turkey, Russia, and Poland," both in 2 vols. 12mo. The lively style and great descriptive power of these works procured them a very large circulation both in America and Europe. In 1839 he was appointed by President Van Buren special ambassador to Central America, explored the ancient remains of that country, and on his return published "Incidents of Travel in Central America, Chiapas, and Yucatan" (2 vols. 8vo., New York, 1841); and in 1842 he again visited Yucatan, and published "Incidents of Travel in Yucatan" (2 vols. 8vo., 1843). These works were illustrated by his fellow-traveller, Mr. Catherwood, and the last two named are of special value as contributions to American antiquities. In 1846 Mr. Stephens was elected a member of the convention for revising the constitution of the state of New York. He was a director of the "Ocean Steam Navigation Company," which established the first American line of transatlantic steamships, and went to Europe as the representative of the company on the trial trip of its first vessel, the Washington. In 1849 he was elected vice-president of the Panama railroad company, negotiated the contract for the right of way with the government of New Granada, was chosen president of the company, and during the winter of 1851-'2 personally superintended the construction of the road, which was nearly completed before his death.

STEPHENSON, a N. W. co. of Illinois, bordering on Wisconsin, and intersected by the Pecatonica river; area, 550 sq. m.; pop. in 1850, 11,666; in 1860, 25,118. The surface is undulating and the soil fertile. The productions in 1850 were 228,267 bushels of wheat, 302,285 of Indian corn, 227,310 of oats, 16,023 tons of hay, 288,567 lbs. of butter, and 18,404 of wool. There were 3 newspaper offices, and 1,800 pupils attending public schools. Lead is found. It is traversed by the Illinois central and the Galena and Chicago railroads. Capital, Freeport.

STEPHENSON, George, the founder of the railway system of Great Britain, and perfecter of the locomotive engine, born in Wylam, Northumberland, June 9, 1781, died at Tapton park, near Chesterfield, Derbyshire, Aug. 12, 1848. His father, a worthy and industrious man, was fireman of the pumping engine at Wylam colliery, and by his utmost exertions was barely able to provide food and clothing for his family, much less to send them to school. George, the 2d of 6 children, consequently grew up without the slightest knowledge of books, and at 9 years of age was employed at two pence a day to look after the cows of a neighbor, to which succeeded other kinds of farm work. It was, however, his highest ambition to follow his father's occupation; and at the age of 14, being known as a steady, intelligent boy, with a taste for mechanics evinced in the construction of miniature engines and windmills, he was appointed assistant fireman at the Dewley Burn colliery, whither the family had removed. For several years he continued to be employed at various collieries as fireman, and afterward as plugman, and gradually acquired so complete a knowledge of the engine as to be able to take it apart and make any ordinary repairs. At 18 he was still ignorant of reading, and even of the letters of the alphabet; but within two years, partly by attending small night schools resorted to by the colliers' children, partly by his own perseverance, he was able to read, write, and cipher with tolerable facility. In 1802 he was married, but became a widower within two years, and removed in 1805 with his infant son, Robert, to Killingworth colliery, where his little earnings were speedily absorbed by the demands which his father's poverty imposed upon him, and by the payment of a considerable sum to procure a substitute in the militia, for which he had been drawn. At this time he was desirous of emigrating to the United States; but being unable to raise sufficient money to pay for his passage and outfit, he set himself steadily to work to repair his losses. In his leisure hours he studied mechanics and engineering, mended clocks and shoes, cut out clothes for the miners, and turned his hand to so many useful purposes that he was regarded by his fellow laborers in the colliery as a sort of universal genius. What was of more benefit to him was the favorable impression which his suggestions for improvements in machinery made upon his employers, who in 1812 appointed him engine-wright at Killingworth, at a salary of £100 a year. With this event his mechanical genius seemed to take a fresh start, and beside erecting a winding engine for drawing up coal and a pumping engine, he projected and laid down a self-acting incline along the declivity of the Willington ballast quay, so arranged that full wagons descending to the vessels drew up the empty ones. The construction of an efficient and economical locomotive steam engine, however, occupied his attention beyond any other subject; and after a careful examination of all the machines within his reach, he commenced, and in July, 1814, completed an engine, which worked successfully on the Killingworth railway, and proved the best yet constructed, though its operation was by no means satisfactory to the inventor. It was the first locomotive made with smooth wheels, and from the outset he rejected the clumsy contrivances which Trevethick, Blenkinsop, and others had thought necessary to secure sufficient adhesion between the wheels and the smooth iron surface of the rails to allow the propulsion of a train. At this early day also he told his friends "there was no limit to the speed of such an engine, if the works could be made to stand it;" an opinion he was subsequently obliged to maintain almost single-handed against the most experienced engineers of England. While engaged in plans for an improved engine, his attention was attracted to the increase in the draught of the furnace obtained by turning the waste steam up the chimney—a practice originating solely in the desire to lessen the noise caused by the escape of the steam; and it immediately occurred to him that the proper application of this principle, by increasing the force of the fire, would greatly augment the power of the boiler to generate steam, and the range and capacity of the engine. Hence originated the steam blast, the most important improvement in the locomotive made up to that time, which, however, has also been claimed for Hackworth, another inventor. It was embodied in Stephenson's next engine, completed in 1815; and in 1816 he constructed others, greatly simplified in the working parts, and which as recently as 1854 formed the model for those employed at Killingworth to drag coal. About this period he invented a miner's safety lamp to obviate the frequent explosions from fire damp, one of which had occurred in 1814 in the colliery under his care. The subject was at the same time brought under the notice of Sir Humphry Davy, and both he and Stephenson, though living hundreds of miles apart, and personally unknown to each other, constructed lamps founded upon identical principles, but arrived at independently by different trains of thought, the former working out his ideas scientifically, the latter mechanically. Stephenson's lamp was practically tested by himself at Killingworth in Oct. 1815, nearly 3 weeks before Sir Humphry made public his invention, and is still employed there. To Davy nevertheless was ascribed the priority of invention, and a sum of £2,000 was raised at a meeting of coal miners and presented to him, £100 being at the same time assigned to Stephenson. The friends of the latter, deeming that injustice had been done him, soon after presented him with £1,000, a proceeding warmly criticized by Sir Humphry, and which provoked a bitter controversy between the partisans of the rival claimants. Having brought the locomotive to a considerable degree of perfection, Stephenson next turned his attention to the improvement of railways, his opinion being that both were parts of one mechanism, and that the employment of steam carriages on common roads was impracticable. For the purpose of making his railways solid and level, and to prevent jerks at the junction of the rails, he took out in 1816 a patent for an improved rail and chair, recommended the employment of heavier rails and the substitution of wrought for cast iron, and established the gauge still generally in use. In connection with these improvements he added considerably to the lightness and strength of the locomotive, and substituted steel springs for the small cylinders on which the boiler had at first rested. Soon after the general peace of 1815 the necessities of internal commerce began to suggest the establishment of railways, although the employment of steam power, except for the purpose of expediting the ascent of heavy grades, was generally considered impracticable. Stephenson and a few others, however, ventured to believe that the locomotive was destined to supersede the mail coach, and the railroad to "become the great highway for the king and all his subjects." His first important undertaking was the construction of a railroad 8 miles in length for the owners of the Hetton colliery, which, on Nov. 18, 1822, was successfully opened, the level parts being traversed by locomotives, while stationary engines were employed to overcome the heavy grades. While this work was in progress similar projects began to be agitated, and in 1820 an act of parliament was obtained for a railway between Stockton and Darlington, of which Stephenson was appointed engineer at a salary of £300. The line was intended to be worked by stationary engines for the steep gradients, with horse power on the level portions; but at Stephenson's urgent request the act was amended so as to permit the use of locomotives on all parts of the road, which, at the expiration of somewhat more than 3 years from its commencement, was formally opened on Sept. 25, 1825, in the presence of immense throngs of spectators. The difficulty experienced in procuring suitable locomotives from the ordinary blacksmiths' shops suggested to him the necessity of establishing a special engine factory, which project was successfully carried into effect, with the coöperation of Mr. Pease, the originator of the Stockton road, at Newcastle-upon-Tyne, where some of the most powerful steam carriages in the world have since been constructed, and many skilled workmen and engineers educated. The year 1825 witnessed the production of a multitude of projects for railways, of which the Liverpool and Manchester line, the most considerable and the only one seriously supported, was destined to be not merely the great achievement of Stephenson's career, but the battle field on which were to be fought the momentous questions of the superiority of railways to common roads, of high to low velocities of transport, and of locomotives to fixed engines. Stephenson made the preliminary surveys in the teeth of an opposition which might have readily disconcerted a less determined spirit; and such were the ignorance and prejudice of land owners and their agents, who sometimes drove the surveyors off their grounds, that much of the work had to be done by stealth. An act of parliament having been procured, Stephenson was appointed principal engineer, and in June, 1826, commenced the construction of the road, which employed him incessantly during the next 4 years. Of the engineering difficulties successfully overcome, the most important was the crossing of Chatmoss, a bog 4½ miles in length, pronounced impassable, on which the road was made to float; a feat, as has been observed, "affording an unequivocal proof of that admirable self-reliance which never contemplates failure." The patience of Stephenson was however destined to be still more severely tried; for during the progress of the undertaking the most eminent engineers persisted in recommending stationary engines in place of locomotives, which they declared unsafe and incapable of attaining a high degree of speed; and the clumsy expedient of a series of stationary machines 1½ miles apart, dragging the trains by ropes, was seriously entertained, and would have been adopted but for the energy of Stephenson and a few of his friends. He finally prevailed on the directors to offer a prize, under certain stipulations, for the most effective locomotive engine for the purposes of the road; and at a trial which took place near Liverpool, Oct. 6, 1829, his engine, the "Rocket," constructed by himself and his son Robert, was adjudged to be the best of the 4 entered, having averaged a speed of 14 miles an hour, and even attained a velocity of 29 miles an hour. The "Rocket," the first high-speed locomotive of the standard modern type, was distinguished above all preceding ones by 3 elements of efficiency: the multitubular boiler, which, if not Stephenson's invention, was first applied by him to locomotives; the blast pipe; and the direct connection of the steam cylinders to one axle and one pair of wheels. At the ceremony of the opening of the road, Sept. 15, 1830, Mr. Huskisson, who was in attendance with many other distinguished public men, having been accidentally struck down and fatally injured by this engine, was conveyed in it from Parkside to Eccles, a distance of 15 miles, at the then unprecedented rate of 36 miles an hour. Having fairly inaugurated the railway system of England, Stephenson was almost incessantly employed for the next 10 years on new roads which were projected in all directions, and even visited Belgium and Spain as a consulting engineer. With his increasing wealth he also engaged extensively and profitably in coal mining, particularly in the neighborhood of Tapton park, an elegant seat in Derbyshire, where he passed his latter years in comfort and peace, beloved by his neighbors of every degree and condition, and presenting in his conduct, as well as in his person and manners, the true ideal of an English gentleman. He preserved through life the simplicity of character which had distinguished him in youth, and on several occasions declined the honor of knighthood. Of his scientific character, Sir J. D. Forbes, who disclaims for him any great inventiveness, makes the following estimate: "His skill rather lay in perceiving how far methods and contrivances already known might be pushed to an advantageous result. He possessed that shrewd decision which ingenious persons often want, enabling him to detect what is truly valuable in the numerous mechanical schemes which at any time are afloat, and to devise the means of realizing them. He also possessed that confidence in his own judgment which is necessary to carry out principles to their legitimate extent, but from which feebler or more practical minds usually shrink." A memoir of George Stephenson, by Samuel Smiles, was published in London in 1856.—ROBERT, a railway constructor and engineer, son of the preceding, born in Willington, near Newcastle-upon-Tyne, Dec. 16, 1803, died Oct. 12, 1859. As a child he evinced remarkable intelligence, and became in some sort a fellow pupil in several branches of knowledge with his father, whose own education was continued far into middle life, and whose earnings were long devoted exclusively to the instruction of his son. The latter, who at 12 years of age began to show a decided inclination for mechanics and science, was, after several years' schooling at Newcastle, and a preparatory training in the collieries, sent in 1822 to the university of Edinburgh.

He returned home in the succeeding year, and after assisting his father in a variety of undertakings and perfecting his knowledge of practical mechanics, accepted in 1824, in the hope of benefiting his health, an engagement as mining engineer in South America. Recalled by his father in 1827, he was employed in various labors connected with the construction of the Liverpool and Manchester railway, and in the improvement of locomotives; and in 1829 he assisted in designing and making the successful locomotive, the "Rocket," which was entered in his name. After being engaged on several minor railway lines, he was appointed engineer of the London and Birmingham road, which under his direction was completed in 1838; and thenceforth for many years his time and talents were almost exclusively occupied with similar undertakings at home and abroad. As an engineer he is known by several stupendous works designed in immediate connection with railways, among the most remarkable of which are the high level bridge over the Tyne at Newcastle, the viaduct over the Tweed valley at Berwick, the Conway bridge, and above all the Britannia tubular bridge across the Menai straits, 1,850 feet in length and 106 above high water mark, which Sir James Forbes pronounces "a triumph of art and science, an honor to his own age, and a lesson to posterity." In this last undertaking he received important assistance from Messrs. Hodgkinson and Fairbairn with respect to various points of construction and the strength of materials; but the credit of conceiving the enterprise belongs wholly to himself, as well as the rectangular form of the tube, of which there had previously been no example in mechanical construction. He was also employed on railways in Belgium, Norway, Italy, France, and other parts of Europe, and visited Egypt several times to superintend the construction of a road between Alexandria and Cairo, on the line of which there are two tubular bridges, traversed by trains on the roof instead of the inside, as in the case of the Britannia bridge. He also designed an immense bridge across the Nile at Kaffre Azzayat. In British North America he has left a memorable specimen of his engineering skill and perseverance amid unprecedented difficulties in the great Victoria tubular bridge, which crosses the St. Lawrence near Montreal, and was formally opened by the prince of Wales in the summer of 1860. In addition to his railway labors he took considerable interest in public affairs, and during the last 12 years of his life represented the Yorkshire borough of Whitby in parliament, where he was known as an able debater on subjects connected with the railway interests of the United Kingdom. He was also a member of several scientific bodies, and received a great gold medal of honor from the French industrial exposition of 1855. His great wealth was liberally expended, and he enjoyed a reputation for private worth and mechanical genius not less distinguished than that of his father. He published a work "On the Locomotive Steam Engine," and another "On the Atmospheric Railway System."

STEPPES. See Plains.

STEREOSCOPE (Gr. *στερεος*, solid, and *σκοπεω*, to see), an optical instrument contrived for combining into one image, which appears solid, or in relief, two plane representations of a statue, a landscape, or any object or field of objects involving three dimensions. The two separate pictures employed for this purpose are so taken as to show the object or field as it would appear when viewed by each of the two eyes separately. Of such pictures, now known as stereoscopic views, the effect, and hence the preparation, depend on the two simple principles, that within certain limits of distance the two eyes see at the same time two really unlike pictures of any solid object or field of objects regarded; and that when two such pictures (for present purposes considered as flat) fall on the retinæ of the corresponding eyes, the result is a perception of solidity in the objects, or of depth in the field, so presented. If a thin book be held up before the eyes, with the back toward the face, and looked at with the right eye only, the back and much of the corresponding side are seen, and in a certain direction; but on looking with the left eye only, the image of the book and the plane in which it appears to lie shift slightly toward the closed eye, and the back with the other side now becomes visible. The book presents to each eye a somewhat different surface, and a different position and perspective. On carefully regarding it with both eyes, its apparent position is intermediate to the two before found; the back and in a degree both the sides are now visible, and the book obviously stands in relief toward the eyes. These appearances, alluded to by Euclid, were more definitely observed and described by Galen about 1,700 years since. The familiar but remarkable result is, that we neither see objects double nor as flat surfaces; but always, when not too far removed, as having depth or relief, or as existing in a space which shows this third dimension. (See Vision.) A diagram expressing to the eye Galen's results was drawn by Baptista Porta; and from this, about A. D. 1598, Jacopo Chimenti prepared pairs of drawings (one pair of which is believed to be still preserved in a museum at Lille) intended to show persons as seen by the two eyes separately, and such that, if viewed with the eyes "crossed" by looking at a point nearer to them than are the drawings, so that each eye receives the image of that which is before the other, they are combined, giving a single image in relief. This method, the "ocular stereoscope," is still conveniently resorted to, after some practice, by those who would get the stereoscopic effect of views without employing an instrument. Aquilonius (1613) wrote a volume on the vision of solid objects, in which this principle was introduced. Mr. Harris (1775) treated on the subject, among other things referring the obviously solid form of the nose as seen by its owner to this effect of vision with two eyes. Prof. Elliott, in 1834, is said to have conceived the plan of an instrument for combining the two single-eye pictures, mentioning it to two or three friends, but not carrying it into execution until 1839. Meanwhile, however, Prof. Wheatstone—to whom is unquestionably due the credit of having devised the first effectual and satisfactory instrument for combining two monocular drawings or pictures into a solid image, as well as of having distinctly brought before the physicists and the public the truth that our actual perception of solidity depends on the combination of two such visual pictures—had exhibited before the royal society in 1838, and also at a meeting of the British association, his "reflecting stereoscope," demonstrating its power to unite pairs of plane geometrical drawings into single and solid forms. Elliott's device was simply a wooden box, 18 inches long, 7 broad, and 4½ deep, in the closed or remote end of which the dissimilar pictures were placed. The views he first employed were two representing a leaning cross, with the moon and the branchless stem of a small tree, nearly in line, and as seen from slightly different positions. No mirrors or lenses are required; but on looking into the box, on the "ocular stereoscope" plan, crossing the eyes, the entire view appears to stand forth in solidity or relief. Wheatstone's arrangement, far superior to this, consists of two plane mirrors about 4 inches square, so placed as to make each an angle of about 45° with the axis of the corresponding eye, the two mirrors being thus at right angles to each other, and the drawings on separate slips being presented, each toward a mirror, at the two sides, and at such a distance and angle that the reflected images thrown to the two eyes respectively shall appear to have come from a single object at a corresponding distance behind the mirrors. Thus the two views are in effect superimposed and united, as in natural vision; and if unlike each other in quite or nearly the same way as when received by the eyes from the actual object, the latter will be exactly represented, though it may be on a reduced scale, but appearing in solid form, so that we seem even to look around and beyond it. Two pictures of a bust become in effect a solid bust; the waters of a cataract stand forth in body; a forest, a mountain, or a group of persons comes out in depth, and we look between and beyond the individual objects, as in the natural view. In 1849 Sir David Brewster devised a more convenient form of instrument for combining the two pictures, which is now in common use. In this, two convex lenses properly adjusted are employed for viewing the pictures; or more commonly, parts of a single large double-convex lens, divided in the middle, the thin edges being set toward each other, and at the ordinary distance of the two eyes, about 2½ inches apart. These are placed in a convenient box, into which the observer looks; while beyond them are the slides or double views, which, in case they are opaque, as upon pasteboard, are viewed by reflected, or if transparent, as on glass, by transmitted light. A diaphragm, extending from in front between and to a little way beyond the two semi-lenses, confines the vision of each eye to its appropriate picture; while the lenses, refracting laterally outward to the eyes the light which passes through them, cause the two images to appear as if originating from a single field between the real places of the views, that is, they superimpose these; and at the same time their effect is to magnify the single resulting image. The instrument is known as the "lenticular stereoscope." In the best simple or hand instruments, the semi-lenses being cut from a single lens not less than 8 inches in diameter, and set edge to edge, a single wide aperture serves for both eyes; and the instrument then suits all eyes without adjustment, and allows of an increased field of view.—As no artist can continually and with certainty execute true pictures of trees, persons, or other near objects, with just those differences of surface and perspective which they naturally present to the two eyes separately, it will readily be seen that the stereoscope could be of little use until aided by photography. The pictures employed must be correct, or their faults are exaggerated. Public attention seems first to have been strongly called to the stereoscope as a means of amusement and of the improved representation of objects, by the fine display of lenticular stereoscopes and of appropriate photographic views placed by M. Duboscq in the great exhibition at London in 1851.—It is certain that the perception of solidity or relief, in ordinary vision, is in some way connected with the degree of convergence of the axes of the two eyes (the optic axes) toward the object, or the point on its surface of which at any moment distinct vision is secured. Though we usually judge of distances in a considerable degree, and beyond a certain limit wholly, by light and shade, or aërial perspective, by intervening objects, and by aid of experience, yet when the objects or their parts are within about 250 to 300 feet, there is a sensible difference in the degree of convergency of the optic axes, and hence in the effort to fix the eyeballs in the required positions, and doubtless therefore in the attending muscular sensations. Within some limit, probably that named, the degree and character of these sensations, though unconsciously to him, enable the observer to judge of distances; to determine that some parts of a given object are nearer, others more remote; and thus, perhaps, during the rapid play of the eyes over the object, to obtain that sense of distances which we interpret into solidity of the object. For objects about 250 feet away, the optic angle is small, and the sensation of effort slight; for those much beyond this, both these in effect vanish, and relief is no longer a perception, but only an inference; for distances far within the limit, the convergency and sensation become marked. Looking into the stereoscope, the effort to converge the eyes must be made, the sensation of such effort attends, and relief is perceived. It may be in this way that two views of an object a mile distant, and taken by the double camera in common use, its lenses little further apart than the eyes, still show relief when seen in the instrument; and that, as has been stated, even two flat pictures exactly alike have in the instrument been made to afford a view in relief. Brewster argues that to produce perfect stereoscopic effect, the two views should always be taken through lenses of the double photographic camera, having no more than ⅛ inch diameter, and placed no more than 2½ inches apart, or successively through one such lens shifted only to such distance, so as to answer exactly to the pictures furnished in nature to the two eyes. When there are moving objects in the field, and also in taking "instantaneous views," so called, the double camera becomes requisite, or two single cameras, stationed at suitable distance and acting together. For stationary objects the single camera is conveniently used, the pictures being taken in succession. In taking stereoscopic pictures, it has been customary (though probably the tendency is now back toward the natural conditions) to exaggerate the effect both in respect to distance between stations and to the size of lens. When the plates used are less sensitive, larger lenses may be employed to accelerate the process; sometimes those of 2, 3, or 4 inches diameter. So a broad base or distance between stations of the camera is resorted to for the purpose of exaggerating the relief; for near persons or statues, sometimes as much as 6 to 8 inches; for landscapes, 10 to 20 inches, or even several feet. Thus, strongly differing sides, perspectives, or projections of the objects are obtained. In the double camera, the tubes through which light enters, to be thrown by a convex lens in each on the prepared plates, are not parallel, but inclined to each other at a certain angle, which is usually less in the cameras for taking portraits than in those for views. But in taking the photographic visiting cards, by 4 parallel tubes directed toward the person and view at the same time, 4 pictures are obtained; then, without shifting the person or instrument, 4 others upon another portion of the same slide; and it is unexpectedly found that of these, any right-hand image being suitably placed in the stereoscope with any left-hand image, perfect relief is the result. With near objects, a long base line and marked difference of perspective result in distorting the objects in the direction from before backward (that of depth); all streets, buildings, and similar views extending away from the eye, appear disproportionately long; and in persons, the head, or an advanced foot, or the dress, is thrown forward to a disagreeable extent. This principle, however, becomes useful in case of bodies so distant that to the eyes, near together as they are, they cannot present the solid form. Remote mountains, buildings, &c., flat to ordinary vision, are made to give unlike views by placing the cameras many feet apart, as they would to a person whose visual organs could be correspondingly separated; and in the stereoscope such views actually give the solid form. This is also the principle of the tele-stereoscope of Helmholtz, in which 4 mirrors are so placed diagonally, the outer pair many feet apart, and the inner at the distance suiting the eyes, that the binocular parallax or angle between the two lines of sight is greatly enlarged, and distinct relief is secured in objects very remote. The angle made by the axes of the two eyes at the point viewed (the "optic angle") is, by both the two methods last named, in effect greatly enlarged—this angle being always a horizontal one—as if the object were very near; but the visual angle of the object, usually regarded especially in the vertical direction, remaining just what it would be with the ordinary base between the eyes, the result is that the judgment of the observer is deceived, and, unless proportionate magnifying power of lenses be employed, the object appears actually diminished in size. The principle of increased distance between stations is availed of in taking stereoscopes of the moon, as has been done by L. M. Rutherfurd of New York, and by W. De la Rue of London. At different seasons the moon presents slightly different faces toward the earth; and two views taken from positions in the earth's orbit 15° apart, and placed in the stereoscope, give a perfect and beautiful globe, its surface diversified with the well known lights and shades of that luminary. M. Claudet, of London, has devised a method in which relief is secured by means of the image of a single picture or object thrown on a ground glass screen, hence termed a stereomonoscope. In this case it is asserted that the image in relief is visible to several spectators at the same time. Another method, by Mr. Maugham, applies glasses of complementary colors, say green and red, to the rays which are thrown by a magic lantern on the screen, and corresponding glasses to the two eyes of each observer, in order to keep separate the rays of the two images; but much light is in this way lost, and the image is faint. Mr. Thomas Skaife, of Blackheath, England, using a small thin lens, of 1 inch focus, has obtained almost instantaneous views which, when magnified, are still extremely well defined and perfect, and which he has termed pistolographs. Enclosed between two plates of glass, and the three semi-fused into one, one of these miniature pictures retains its beauty, while it is protected and preserved; the combination he has termed the chromo-crystal. It is stated that Mr. John Sang, of Kirkcaldy, has recently, by means as yet kept secret, imparted the stereoscopic effect, or relief, to copies of flat surfaces, such as paintings and engravings.—Several instruments have been invented for the purpose of exhibiting a large number of views in succession, usually involving the revolution of an endless band carrying holders, in which the slides or views are previously placed, and by which they are brought successively into suitable position. Prof. H. W. Dove, by covering slides with printed lines, each one repeated, for one eye commencing evenly, and for the other every alternate line being set in or indented, has secured a perfect imitation of the effect of a double-refracting crystal. He has accordingly proposed to detect spurious bank notes which are copies of the genuine, by observing any suspected note alongside of one known to be genuine in the stereoscope; if the former be spurious, slight misplacements of words or lines, inappreciable to the unaided eye, will distinctly show the double-refractive effect, by an apparent projection of such out of the plane of the paper. Copies of prints or drawings may in like manner be known from the originals; with genuine duplicate notes or prints the effect is not observed. Other applications have been proposed, though not yet probably to any great extent adopted. But as a means of amusement, within the past 10 years the stereoscope has risen to a very prominent place in commerce as well as in art; and experienced artists are already visiting almost every portion of the earth's surface, known or supposed to offer objects of historical interest or scenery of striking character; while groups illustrative of domestic and other supposable scenes and situations are multiplied continually.—Prof. E. Emerson, of Troy university, N. Y., has devised a simple means of remedying a common defect of the lenticular stereoscope. (See the "American Journal of Science," Nov. 1861.) The two semi-lenses being fixed at the distance from each other supposed to be that ordinarily required, there may still be very great difficulty or even an impossibility of uniting the two pictures on the slides into one impression in relief; and this mainly from two causes—that the pictures are at improper distances apart, the distance between their centres varying from 2¼ to 3¼ inches; and that the width between the observer's eyes may also change much. An instrument enabling us to see equally well views whose separation may vary by an inch or more thus becomes a desideratum. In the ordinary arrangement, moreover, the size of each picture is confined to about 3 inches each way, or an area of 9 square inches; the views must be taken under an angle correspondingly small; and even if these be afterward magnified in viewing, still nothing is added in this way to the actual completeness of details. Now, while the lenses employed in the stereoscope are each constant in focal length, yet each will vary in the power of deflecting a ray, this power increasing from the centre out to the thin edge. Consequently, pictures at such distance apart as to be readily united through the middle part of the lenses, require to be separated more and more as we separate the lenses themselves, looking through their more deflecting portions. This circumstance suggests the means of giving to the instrument a general character, and adapting it to all sorts of views as well as to differences in the width between the eyes. The modification given is that of rendering the lenses movable in a horizontal direction, approaching till the edges touch, or separating as far as the eyes will allow, each lens moving through slightly more than an inch. The lenses must move simultaneously, at the same rate, and in opposite directions; when the right lens moves to the right, the left goes to the left, and *vice versa.* This is accomplished by fitting the lenses to slide in a brass frame, and attaching the lower edge of each to a nut; within the right nut turns a right-hand screw, and within the left a left-hand screw; and the threads of both screws being cut in the same horizontal rod, both lenses are actuated simultaneously and oppositely by turning the rod by a milled head at one side of the instrument. With this arrangement, the separation of the centres may vary from 2 as far as to 4½ inches, or with achromatic lenses to 5 inches; and as an incidental advantage, views may thus be employed which, as taken, cover an area of 20 square inches, or twice that of those in general use.

STEREOTYPE PRINTING. See PRINTING.

STERLING. See POUND STERLING.

STERLING, JOHN, a British author, born at Kaimes castle, in the isle of Bute, July 20, 1806, died at Ventnor, in the isle of Wight, Sept. 18, 1844. His father, Edward Sterling, had been educated for the Irish bar, had served for a time as captain in the army, was now occupied as a gentleman farmer, and afterward became a leading writer of the London "Times." John was the second of 7 children, 5 of whom died in youth. The family removed to Paris during the peace of 1814, but fled on the return of Napoleon from Elba, and settled in London. At the age of 16 he was sent to the university of Glasgow, whence he was removed in the following year to Trinity college, Cambridge, where he was the chief speaker in the union debating club, and was intimate with a group of young men including F. D. Maurice, R. C. Trench, J. M. Kemble, Charles Buller, and Monckton Milnes. In 1828 he and his friend Maurice became proprietors and editors of the recently established "Athenæum," which soon passed out of their hands. Sterling continued to reside in London, and gained the friendship of Coleridge, of whom he was a most enthusiastic admirer. In 1829-'30 he wrote his novel of "Arthur Coningsby" (3 vols., 1833), the hero of which foreshadowed his own career by passing through radicalism, by means of what Carlyle calls the "Coleridgean legerdemain," up to faith in the church, in which he finally takes orders. In 1830 he was married, and soon after, for the benefit of his health, went with his wife to the island of St. Vincent in the West Indies, where he resided 15 months on a sugar estate. In 1833, under the influence of his former tutor, J. C. Hare, and of Coleridge, he resolved to enter holy orders, was ordained deacon at Chichester in 1834, and at once became curate of Hurstmonceaux in Sussex, where his friend Hare was rector. At the end of 8 months ill health compelled him to retire from the ministry, which he never resumed. He removed to London, where he now first met Carlyle, who soon filled the place of Mentor to him, which had before been held by Coleridge. From this time literature was his chief pursuit. Carlyle describes him as busy but unproductive, roaming among his friends, a welcome illumination to all, his address everywhere pleasant and enlivening. His ill health continuing, in 1836 he went to the south of France, and in the following year to Madeira; part of the years 1838 and 1839 he passed in Italy; visited Madeira again in 1840; and in 1841 settled at Falmouth, from which he made frequent visits to London. Meantime he had contributed to "Blackwood's Magazine" his delightful "Legendary Lore;" wrote for the "Westminster Review," then under the charge of John Stuart Mill; and was engaged on other compositions, in prose and verse. For the purpose of meeting him on his hasty visits to London, the Sterling club had been formed, among the members of which, beside his friends already mentioned, were Tennyson and Sir G. C. Lewis. He published in 1839 a collection of minor poems; in 1841 "The Election," a poem of English life and society; and in 1843 a drama entitled "Strafford." During the last named year both his wife and mother died, and his own health was rendered more precarious by the bursting of a blood vessel. He retired in 1843 to the isle of Wight, and there commenced a poem entitled "Cœur de Lion," which he did not live to complete. In 1848 a collection of his "Essays and Tales," from periodicals, was edited by Archdeacon Hare, with a biography prefixed (2 vols.). The biography dwelt specially upon the religious aspects of his character, as a heroic truth-seeker and a laborious curate. Mr. Carlyle, deeming this the least significant phase of his career, holding that artistic admiration was his *forte*, and not devotion in any form, and condemning his entrance into the church as "a weak, false, unwise, and unpermitted step," published in 1851 his own "Life of Sterling," one of his best productions and one of the most remarkable of biographies. In 1851 "Twelve Letters by John Sterling" were edited by his relative, Mr. Coningham.

STERNBERG, Alexander von, baron, a German novelist, born near Revel, in Esthonia, April 22, 1806. He was educated at Dorpat, and abandoned the study of law for literature. He left Russia in 1830, passed several years in travel, and since 1843 has lived in Berlin. His writings are lively, satirical, and aristocratic. Several collections of his works have been published.

STERNE, Laurence, an English divine and author, born in Clonmel, Ireland, Nov. 24, 1713, died in London, March 18, 1768. His parents were both English, and his father, Roger Sterne, a grandson of Dr. Richard Sterne, archbishop of York in the time of Charles II., was a lieutenant in Handaside's regiment, the movements of which, "from barrack to transport, from Ireland to England," young Laurence followed until his 10th year, when he was put to school at Halifax in England. Having been adopted by his kinsman, Mr. Sterne of Elvington, he was in 1733 admitted of Jesus college, Cambridge, where he was graduated in 1736; soon after which he took orders and was presented, through the influence of his uncle, the Rev. Jaques Sterne, to the living of Sutton in Yorkshire, to which preferment a few years later was added a prebend in York cathedral. In 1741 he was married after an ardent courtship of several years, although he lived long enough to cordially hate his wife; and about the same time, through her connections, he obtained the living of Stillington, adjoining Sutton. For nearly 20 years he pursued the career of a rural incumbent, enjoying good health and amusing himself with "books, painting, fiddling, and shooting;" and during this period his only publications appear to have been two sermons, although he probably wrote political paragraphs for the newspapers, and is said to have conducted for some time a periodical electioneering paper in the whig interest. In 1759 he published at York, under the pseudonyme of "Mr. Yorick," the first two volumes of "Tristam Shandy," which were reprinted in London early in 1760. The 3d and 4th volumes appeared in 1761, the 5th and 6th in 1762, the 7th and 8th in 1765, and the 9th in 1767. Long before the completion of the work, the charm and the novelty of the style, abrupt and exclamatory rather than continuous, the whimsical digressions, the exquisite touches of pathos and humor, and its many admirably conceived characters, had taken an extraordinary hold upon the public, and Sterne took his place by the side of Fielding and Richardson and Smollett as a great writer of prose fiction. He was extensively lionized in London, where people were invited a fortnight in advance to dine with him; and Boswell has recorded Johnson's remark that "the man, Sterne, had engagements for three months." The erudition which so greatly astonished the not very learned readers who welcomed the appearance of "Tristam Shandy," will however scarcely stand the test of modern criticism; and it has been shown by Dr. Ferriar in his "Illustrations of Sterne" (1798), that the quaint imagery and the quainter conceits and fancies scattered through the book, were largely borrowed from Rabelais, Burton, and other authors not generally read in Sterne's time or even now. But after making liberal allowances for plagiarisms, his Uncle Toby, Corporal Trim, Mr. Shandy, Dr. Slop, and Widow Wadman, "creations of a fine fancy working in an ideal atmosphere, and not mere copies or caricatures of individualities actually observed," must be considered beyond all doubt among the most original personages in fiction; and in his peculiar vein of humor it would be difficult to name any author whom he resembles. Thackeray has noted the influence of Sterne's early association with military men and scenes upon some of the most delightful and picturesque passages, which he characterizes as "reminiscences of the boy who had lived with the followers of William and Marlborough, and had beat time with his little feet to the pipers of Ramillies in Dublin barrack yard, or played with the torn flags and halberds of Malplaquet on the parade ground at Clonmel." In 1760 and 1766, during the publication of "Tristam Shandy," appeared 4 volumes of sermons, also by "Mr. Yorick," which met with considerable favor, more perhaps on the score of their paternity than on account of their actual merit. Gray, in his correspondence, while admitting that "they are in style most proper for the pulpit," confesses that the author seems "often tottering on the verge of laughter, and ready to throw his periwig in the face of the audience." In 1760 Sterne received an additional living at Coxwold in Yorkshire; but subsequent to this time he seems to have lived principally in London or on the continent, leaving his wife and daughter to reside in York. In 1762 he visited France, and between 1764 and 1767 spent much time in southern Europe for the benefit of his health, now seriously impaired. Returning to England, he recorded the impressions of his travels in "The Sentimental Journey," which speedily obtained a European reputation. He died soon after the appearance of the book, of which the first part only was completed, at hired lodgings in London, surrounded by strangers, by whom, it has been said, his body was rifled while he was expiring. In 1775 his daughter Lydia published 3 volumes of his "Letters to his Friends," accompanied by a short autobiographical memoir; and in the same year appeared "Letters to Eliza," consisting o 10 letters addressed by Sterne in March and April, 1767, to "Mrs. Elizabeth Draper, wife of Daniel Draper, Esq., counsellor at Bombay, and at present chief of the factory at Surat," and another collection of letters in one volume. With the exception of a few fragments and a collection of "Seven Letters by Sterne and his Friends," printed for private circulation in 1844, these are his only remaining writings that have been published.—Of the personal character of Sterne, as seen in his life and letters, no favorable impression can be formed. The latter show him to have been indifferent to the duties of his profession, lax in principle, a bad husband, a faithless lover, offering his affections to 2 or 3 married women at once, the dupe of every coarse flatterer, and false to his professions of virtue or sensibility. With wonderful power to move his readers to tears or laughter, he was rather a great jester than a great humorist, wasting his pathos on the most trivial objects, apparently "to make points and seek applause," and leaving the mind in doubt whether it were genuine feeling or a piece of consummate acting. Masson, however, is of the opinion that "not even the artificiality of his pathos can take away the effect on our sympathies," and that "so far as sensibility can be taught by fiction, his works teach it." The gravest charge brought against him, and one which not even the character of the age in which he lived nor the exquisite accuracy and finish of his diction can palliate, is a tendency to indecency. "There is not a page in Sterne's writings," says Thackeray, with a severity perhaps not wholly merited, "but has something that were better away, a latent corruption—a hint, as of some impure presence; the foul satyr's eyes leer out of the leaves constantly." Sterne was tall and thin, with a hectic and consumptive appearance.

STERNHOLD, Thomas, an English writer of psalms, born in Hampshire about the commencement of the 16th century, died in 1549. He was groom of the robes to Henry VIII. and Edward VI., and was noted at court for his poetical talents and extreme piety. Impressed with the necessity of procuring a substitute for the profane songs in vogue, he undertook a translation into metre of the Psalms of David, hoping they might become popular with the courtiers. He completed only 37, which were printed in 1549, after his death, with 7 by Hopkins, under the title of "All such Psalms of David as Thomas Sternholde, late Grome of the Kinges Majestyes Robes, did in his lyfe-tyme drawe into Englyshe Metre." The version was completed by John Hopkins and others, and was published in 1562 as "The Whole Book of Psalms, collected into English Metre by T. Sternhold, J. Hopkins, and others, conferred with the Ebreu; with apt Notes to sing them withal;" under which title it was annexed to the "Book of Common Prayer," and continued in use until superseded by the "New Version" of Tate and Brady, first published in 1696. Sternhold was also the author of "Certain Chapters of the Proverbs of Solomon, drawen into Metre" (London, 1549). Sternhold's versions are now remembered only for their antiquity and the prominent place they once occupied in English psalmody.

STESICHORUS, a Greek lyric poet, born in Himera, Sicily, flourished during the first part of the 6th century B. C. He appears to have lived to the age of 80 or 85. The incidents of his life are mostly of doubtful authenticity. He is said to have been educated at Catana, and to have been on friendly terms with Phalaris, tyrant of Agrigentum, and is supposed to have travelled in Greece. Suidas says that his name was originally Tisias, but was changed to Stesichorus because he was the first to establish a chorus for singing to the harp. By some he has been called the inventor of choral poetry. He wrote in the Doric dialect, intermixed with epic. His poems were chiefly on heroic subjects, although he wrote many on themes more purely lyrical. He was the first of the Greek poets who composed erotic poems. Fragments only of his writings are now extant. The best collection is that of O. F. Kleine, entitled *Stesichori Himerensis Fragmenta*, with a dissertation on his life and poetry (8vo., Berlin, 1828).

STETHOSCOPE. See Auscultation.

STETTIN, a town of Prussia, capital of the province of Pomerania, and of the administrative district of its own name, situated on the left bank of the Oder, 76 m. N. E. from Berlin; pop. in 1858, 53,094. The river is crossed by two bridges, and the town is defended by walls, a citadel, and several forts and outworks. It is entered by 5 principal and several smaller gates, 2 of the former being highly ornamented. The town is old, but it contains several fine squares, and is generally well built. The ancient castle of Stettin, which was the residence of the dukes of Pomerania, contains a collection of northern antiquities, and in the chapel attached to it is the ducal vault. Woollen, linen, cotton, sugar, anchors, &c., are manufactured. The value of the imports in 1854 was $12,295,800, and of the exports $6,571,550. In 1858 the total value of the imports was $17,000,000. The number of vessels entered in 1858 was 3,007, tonnage 541,978; and 58,572 tons of shipping was registered in the port.—In the year 830 a large village and a temple to the Wendish idol Trigloff occupied the present site of Stettin. The temple was destroyed and rebuilt several times, and when Christianity was introduced about the beginning of the 13th century a large treasure was found in it. Stettin has belonged at different times to Denmark, Sweden, and Prussia.

STEUART, Sir James, a Scottish political economist, born in Edinburgh, Oct. 10, 1713, died Nov. 26, 1780. He completed his education at the university of Edinburgh, and in 1734 was admitted to the Scottish bar, at which however he rarely practised. Although of a whig family, he became, through intercourse on the continent with several exiled adherents of the old pretender, imbued with Jacobite doctrines; and having declared for the young pretender in 1745, he was sent by him on a mission to the court of France, where he was residing at the time of the battle of Culloden. The consequence was a compulsory absence from Great Britain for nearly 18 years. He resided during the greater part of this period at Angoulême, and employed his leisure in those studies which were afterward embodied in his books. In 1763 he was permitted to return to Scotland, where he passed the remainder of his life, although it was not until 1771 that he obtained a free pardon from government. While abroad he published several works on currency, and in 1767 produced his "Inquiry into the Principles of Political Economy" (2 vols. 4to.), the first considerable English work on the subject. (See Political Economy, vol. xiii. p. 449.) Among his remaining works are: "The Principles of Money applied to the Present State of the Coin of Bengal," "A Plan for introducing an Uniformity of Weights and Measures," &c. A complete edition of his works was edited by his son, Sir James Steuart (6 vols. 8vo., 1805).

STEUBEN. I. A S. W. co. of New York, bordering on Pennsylvania and drained by the Chemung, Canisteo, Tioga, and Conhocton rivers; area, 1,500 sq. m.; pop. in 1860, 66,689. The surface is broken and the soil generally very fertile. The productions in 1855 were 307,604 bushels of wheat, 711,307 of oats, 292,689 of Indian corn, 255,938 of potatoes, 297,289 of apples, 58,749 tons of hay, 1,976,129 lbs. of butter, 336,334 of wool, 113,653 of honey, and 112,287 of maple sugar. There were 9 furnaces, 2 car factories, 42 grist mills, 238 saw mills, 15 shingle factories, 7 newspaper offices, 105 churches, and 341 schools. Iron ore and superior building stone are found. There are 2 or 3 small lakes, and Crooked lake is partly within the county. It is traversed by the Erie, the Buffalo, New York, and Erie, and the Blossburg and Corning railroads, and the Chemung and other canals. Considerable lumber is exported. Seats of justice, Bath and Corning. II. A N. E. co. of Indiana, bordering on Ohio and Michigan, and intersected by the St. Joseph's and Pigeon rivers; area, 314 sq. m.; pop. in 1860, 10,374. The surface is prairie and woodland, and the soil fertile. The productions in 1850 were 101,190 bushels of Indian corn, 73,141 of wheat, 38,734 of oats, and 5,389 tons of hay. There were 4 churches, and 1,600 pupils in public schools. Capital, Angola.

STEUBEN, Frederic William Augustus, baron, an officer of the American revolution, born in Magdeburg, Prussia, Nov. 15, 1730, died near Utica, N. Y., Nov. 28, 1794. He was educated at the Jesuit colleges of Neisse and Breslau, and when only 14 years old served as a volunteer under his father, who was an officer in the army of Frederic the Great, and was at the siege of Prague. In 1747 he was appointed a cadet in an infantry regiment, became an ensign in 1749, and a lieutenant in 1753. In 1757 he distinguished himself at the battles of Prague and Rossbach, in 1758 was appointed an adjutant-general, and was in the battles of Kay and Kunersdorf, in the latter of which he was wounded. On the capitulation of Treptow in 1761, he was sent to St. Petersburg as a prisoner of war, but released shortly afterward. In 1762 he was appointed adjutant-general in the king's staff, and had charge of the quartermaster's department. He was a member of Frederic's select academy of young officers who were under his special instruction; and after the siege of Schweidnitz, in which he participated, the king presented him with a valuable lay benefice. At the close of the 7 years' war Steuben retired from the army and devoted himself to travel, accompanying the prince of Hohenzollern-Hechingen to a number of the courts of Europe. That prince appointed him in 1764 grand marshal, and general of his guard. Steuben was on terms of intimacy and friendship with a number of the European literary characters and noblemen of his time. In 1777, while on a visit to France, the count St. Germain solicited him to come to America; and Steuben, after frequent interviews with the American commissioners, finally decided to acquiesce. He arrived at Portsmouth, N. H., Dec. 1, 1777, and immediately wrote to congress and to Gen. Washington, tendering his services as a volunteer, and expressing the strongest sympathy with the cause of the colonies. Shortly afterward he proceeded to York, Penn., where congress was in session, was directed to join the army under Washington, and during the winter arrived at Valley Forge. On May 5, 1778, he was appointed inspector-general with the rank of major-general, and by his excellent management greatly improved the condition of the continental troops. In June following he was at the battle of Monmouth. He prepared a manual for the army, which was approved by congress in 1779, and introduced the most thorough discipline; and much of the success of the revolution is to be attributed to his sagacious and rigid regulations. He was a member of the court martial on the trial of Major André. In 1780 he was placed in command of the troops in Virginia, and in January following was active in harassing the British forces under Benedict Arnold. The next summer he was attached to Gen. Lafayette's division, and took an important part in the siege of Yorktown. He was distinguished for his generosity and kindness of heart, and was frequently known to share his last dollar with the suffering soldiers. At various times he contributed most of his clothing and camp equipments to the men, and labored unceasingly to promote their comfort and welfare. After the war, in the impoverished condition of the country, congress was tardy in rewarding him for his services, and he experienced much annoyance and vexatious delay in securing an appropriation for his pay and to reimburse him for personal expenses incurred in providing the soldiers with clothing and arms. In 1790 congress voted him a life annuity of $2,500. Several of the states passed resolutions acknowledging his eminent services, and voted him tracts of land. New York presented him with 16,000 acres near Utica, forming a township called from him Steuben, on which he settled and passed the remainder of his life, giving portions of the land to his aids, and leasing the remainder to settlers. His life has been written by Francis Bowen in Sparks's "American Biography," and by Friedrich Kapp (New York, 1860).

STEUBENVILLE, a city and the capital of Jefferson co., Ohio, on the Ohio river, 22 m. N. from Wheeling, Va., 35 m. W. from Pittsburg, Penn., and 141 m. E. from Columbus; pop. in 1860, 6,154. It stands on an elevation on the right bank of the river, is well laid out and substantially built, is surrounded by a rich farming and stock-growing country, and is the centre of an important trade. It has 2 cotton factories, 3 woollen factories, a paper mill, an extensive rolling mill, a glass factory, 2 iron founderies, a brass foundery, copperas establishments, machine shops, a coal and carbon oil refinery, an extensive white lead manufactory, a distillery, and a number of large flouring mills. It has 2 banks, 1 daily and 3 weekly newspapers, 12 churches, and a female seminary, which enjoys a high reputation and usually has about 150 pupils. The seminary building is a handsome structure, erected at a cost of $40,000. The river division of the Cleveland and Pittsburg railroad passes through the city, and it is the present terminus of the Steubenville and Indiana railroad. Abundance of excellent coal is found in the neighborhood.

STEVENS, Abel, LL.D., an American clergyman, born in Philadelphia, Jan. 19, 1815. He studied at the Wilbraham academy, Mass., and the Wesleyan university, Middletown, Conn. In 1834 he was settled as pastor of a Methodist church in Boston; in 1837 he travelled in Europe, and corresponded extensively with American journals. After his return, he was stationed about 3 years in Providence, R. I. He next removed to Boston in 1840, and took editorial charge of "Zion's Herald," a religious newspaper; in 1852 he removed to New York, and was appointed editor of the "National Magazine;" in 1855 he revisited Europe; and on his return in 1856 was elected editor of the "Christian Advocate and Journal." Dr. Stevens has published "Memorials of the Introduction of Methodism into New England," "Memorials of the Progress of Methodism in the Eastern States," "Church Polity," "The Preaching required by the Times," "Sketches and Incidents, a Budget from the Saddle Bags of an Itinerant," "The Great Reform," and a "History of the Religious Movement of the Eighteenth Century called Methodism" (3 vols., New York, 1859-'62). About 100,000 volumes of his works have been issued.

STEVENS, George Alexander, an English author, born in London in the early part of the 18th century, died in 1784. He commenced life as a strolling actor, and gradually acquired some reputation as a writer of burlesques and of comic songs. In 1760 he published a novel, "The History of Tom Fool," and a few years later produced an entertainment entitled "A Lecture on Heads," which he gave with remarkable success. He also published a volume of "Songs, Comic and Satirical" (1772); and after his death appeared "The Adventures of a Speculist, compiled from the Papers of G. A. Stevens, with his Life, a Preface, and

Notes" (1788). Of his songs, 100 in number, one only, "The Storm," is still popular.

STEVENS, John, an American inventor, born in New York in 1749, died in Hoboken, N. J., in 1838. In 1787, having accidentally seen the imperfect steamboat of John Fitch, he at once became interested in steam propulsion, and experimented constantly for the next 30 years on the subject. In 1789 he petitioned the legislature of New York for a grant of the exclusive navigation of the waters of that state. The petition was accompanied with draughts of the plan of his steamboat, but the right was not granted. In 1804 Mr. Stevens constructed a propeller, a small open boat worked by steam, and his success was such that he built the Phenix steamboat, which was completed but a very short time after Fulton had finished the Clermont. Fulton having obtained the exclusive right to the navigation of the Hudson, Mr. Stevens placed his boats on the Delaware and Connecticut. In 1812 he published a remarkable pamphlet urging the government to make experiments in railways traversed by steam carriages; and if his plan (which varied very little from the present railways) should prove feasible, he proposed the construction of such a railway from Albany to Lake Erie. The railway engines, he thought, might traverse the roads at a speed of 50 miles or even more per hour, though probably in practice it would be found convenient not to exceed 20 or 30 miles an hour. The details of construction of the roadway and of the locomotives and carriages are given with such minuteness and accuracy, that it is difficult to realize that their only existence at that time was in the mind of the inventor.—Robert Livingston, son of the preceding, also an inventor, born at Hoboken, N. J., in 1788, died there, April 20, 1856. Inheriting his father's mechanical genius and his deep interest in propulsion by steam on land and water, he while young commenced a course of discovery and improvement on these subjects which have given him a very high rank among modern inventors. At the age of 20 he constructed a steamboat with concave water lines, the first application of the wave line to ship building; soon after used for the first time vertical buckets on pivots in the paddle wheels of steamers, suspended the guard beam by iron rods, and adopted a new method of bracing and fastening steamboats; in 1818 discovered the advantage of using steam expansively, and of employing anthracite coal as a fuel for steamers; in 1822 substituted the skeleton wrought iron walking beam for the heavy cast iron walking beam previously in use; first placed the boilers on the guards, and divided the buckets on the water wheels in order to lessen the jar of the boat; in 1824 applied artificial blast to the boiler furnace by means of blowers, and in 1827 the hog frame (so called) to boats, to prevent them from bending at the centre; and during the next 22 years made numerous other improvements, in the way of balance valves, tubular boilers, steam packing, cut-offs, cross propellers to turn boats as on a pivot, the forcing of air under the bottom of the steamer John Wilson to lighten the draft, &c. He had also during this period invented and put into use the T rail, and used successfully anthracite coal as a fuel for fast passenger locomotives. He had at an early age established steam ferry boats on the Hudson river, and on the organization of the Camden and Amboy railroad took a deep interest in its management, and was for many years its president. In 1813-'14 he invented an elongated bomb shell of great destructive power, and imparted to the government the secret of its construction, in consideration of which he received a large annuity. In 1842 he commenced experiments with a view to the construction of an iron-plated war steamer or battery, which should be shot and shell proof. (See Battery.) This battery is not yet completed, but the propriety of finishing it is now (Feb. 1862) under consideration.

STEVENSON, Andrew, an American statesman, born in Virginia in 1784, died at Blenheim, Albemarle co., Va., June 25, 1857. He studied law and attained a prominent position at the bar. In 1804 he was elected to the house of delegates of Virginia, and after being a member for several sessions was chosen speaker. In 1821 he was elected a representative in congress, and for 13 years held that office, for the last 6 of which he was speaker of the house. He was minister to England from 1836 to 1841, and on his return became rector of the university of Virginia, and devoted the remainder of his life to the duties of that office and to agricultural pursuits.

STEWARD, Lord High, in England, the highest officer under the crown, who was formerly known by the Latin title of *magnus seneschallus*. The office was under the Plantagenets hereditary, but since the reign of Henry IV. has been abolished as a permanent dignity, and is conferred for some special occasion, as a trial before the house of peers or a coronation, after which its functions cease. The lord high steward presides at the former, and at the close of the proceedings breaks his wand and dissolves the court.—The office of steward, or stewart, also existed from early times in Scotland, and gave name to the royal family of Stuart, in which it had been hereditary from the time of Malcolm III. (1056-'93) till the accession to the throne of Robert (II.) Stuart, grandson of King Robert Bruce, in 1371.

STEWART. I. A W. S. W. co. of Ga., bounded W. by the Chattahoochee, separating it from Alabama, and drained by several of its tributaries; area, 700 sq. m.; pop. in 1860, 13,423, of whom 7,885 were slaves. The soil is fertile. The productions in 1850 were 684,449 bushels of Indian corn, 171,791 of sweet potatoes, 16,390 lbs. of rice, and 19,165 bales of cotton. There were 9 farm implement factories, 4 grist mills, 7 saw mills, 3 tanneries, 23 churches, and 660 pupils attending public schools. Capital, Lumpkin. II. A N. W. co. of Tenn., bordering on Ky., intersected by the Cumberland river, and bounded W. by the Tennessee; area, 700 sq. m.; pop. in 1860, 9,888, of whom 2,405 were slaves. The surface is undulating and the soil very fertile. The productions in 1850 were 584,050 bushels of Indian corn, 22,020 of sweet potatoes, 43,225 of oats, 290,320 lbs. of tobacco, and 92,625 of butter. There were 11 grist mills, 9 saw mills, 5 forges, 3 tanneries, 42 churches, and 248 pupils attending public schools. Capital, Dover.

STEWART, Charles, an American naval officer, born in Philadelphia, July 28, 1778. He entered the navy as lieutenant in March, 1798, and performed his first service in the frigate United States, Com. John Barry. He remained in this ship, which was employed in the West Indies for the protection of American commerce against French privateers, until July, 1800, when he was appointed to the command of the schooner Experiment, of 12 guns, upon the same station. While lying in Rupert's bay, island of Dominica, he ascertained that an impressed American seaman was on board H. B. M. ship Siam, whose release he demanded, and after some negotiation obtained from the English commander. On Sept. 1 the Experiment fell in with and captured, after an action of 10 minutes, the French schooner Deux Amis, of 8 guns; and soon after, while cruising near the island of Barbuda, she captured, after a very short action, the French schooner Diana, of 14 guns. In addition to these two captures, she recaptured a number of American vessels which had been taken by French privateers. In 1801 the Experiment arrived at Norfolk, Va., and was sold out of service; and in the following year Lieut. Stewart made a short cruise as first lieutenant of the frigate Constellation, employed in the blockade of Tripoli. Upon the termination of this cruise he was appointed to command the brig Siren in the squadron of Com. Edward Preble, and participated in the naval operations of 1804 against Tripoli. He coöperated with Lieut. Com. Stephen Decatur, jr., in the destruction of the frigate Philadelphia on Feb. 16, as well as in the several attacks on the city and its defences; and for his services in the bombardment of Aug. 3, 1804, he received the thanks of Com. Preble in general orders. He was promoted to the rank of master and commander, and upon the conclusion of peace with Tripoli returned to the United States in command of the frigate Constellation. In 1806 he was captain, and was employed in superintending the construction of gun boats at New York. Upon the declaration of war by the United States against England in 1812, the government resolved to withdraw the American ships of war from the ocean and devote them to harbor defence, upon the ground that they would soon be captured by the overwhelming naval force of England; but Capts. Stewart and William Bainbridge united in most earnest efforts to induce a change of policy in this respect, and succeeded. In conformity with their suggestions, the ships of war were ordered to sea, and in Dec. 1812, Capt. Stewart was appointed to the frigate Constellation, then lying at Norfolk. In the summer of 1813 he was transferred to the Constitution, there seeming to be no possibility of his eluding with the Constellation a close blockade of Norfolk, which was maintained by a strong British squadron. In December he sailed from Boston upon a cruise, which extended to the coasts of Surinam, Berbice, Demerara, and the Windward islands, resulting in the capture of the British schooner of war Pictou, of 14 guns, a letter of marque under her convoy, and several merchant vessels. In April, 1814, the Constitution was chased into the port of Marblehead by the British frigates La Nymphe and Junon. About the middle of December following, Capt. Stewart sailed in the same ship upon a second cruise, and on Feb. 20 he fell in with and captured, after an action of 40 minutes, H. B. M. ship Cyane, Capt. Falcon, mounting 34 guns, with 185 men, and the sloop of war Levant, Capt. Douglass, of 21 guns and 156 men. The Constitution mounted 52 guns with 470 men. The action was fought at night, and at the commencement of it the three ships were close-hauled and formed nearly an equilateral triangle, the Constitution being to windward. By judicious manœuvring she forced her antagonists down to leeward, and raked them both, while she avoided being raked herself. No British official account of this action has been published. By some statements the joint loss of their two ships is given at 41, while that of the Constitution was but 3 killed and 12 wounded. On March 10 the Constitution arrived at Port Praya, Cape Verd islands, with her prizes, and while a cartel was preparing to convey the prisoners to the United States a British squadron appeared in the offing. Capt. Stewart believed that the neutrality of the port would not be respected, and therefore cut his cables and put to sea, the prizes following. The squadron was composed of two line-of-battle ships and a heavy frigate, and an active chase ensued, which resulted in the recapture of the Levant. The Cyane arrived at New York on April 15, and the Constitution about the middle of May. Civic honors were bestowed upon Capt. Stewart by New York and Philadelphia; congress voted him a gold medal, and silver ones to each of his commissioned officers, and also passed a vote of thanks to him, his officers, and men; and Pennsylvania voted him a sword. From 1816 to 1820 Com. Stewart commanded a squadron in the Mediterranean, the Franklin ship of the line bearing his flag. In 1821 he hoisted his flag in the same ship for the Pacific station, where he commanded 3 years. His later services have been upon the board of navy commissioners from 1830 to 1833, and in command of the home squadron and of the naval station at Philadelphia. He has also rendered important services in the organization of the navy, and submitted to the navy department at different times valuable papers on the subject. In 1857 he was placed upon the reserved list of the navy, his advanced age, in the opinion of the board appointed under the act of congress of Jan. 16 of that year, leaving them no discretion in his case; but in March, 1859, he was placed upon the active list by special legislation under a new commission as senior flag officer. He was recently at his own request relieved from the command of the navy yard at Philadelphia, and now (1862) resides upon his estate at Bordentown, N. J.

STEWART, Dugald, a Scottish metaphysician, born in Edinburgh, Nov. 22, 1753, died there, June 11, 1828. The son of Dr. Matthew Stewart, a clergyman and mathematical professor, he was educated at the high school and university of his native city, attracted notice by his taste and capacity for purely philosophical studies, heard the lectures of Reid at Glasgow during one term (1771–'2), was recalled to Edinburgh to act as his father's substitute in the charge of the mathematical classes, and was formally elected conjoint professor as soon as he had completed his 21st year. For several years he was prominent in the weekly debates of the speculative society, before which he also read essays on philosophical subjects. He conducted the class in moral philosophy for one session (1778–'9), during the absence of Prof. Ferguson, upon whose resignation in 1785 he was elected his successor; and as a lecturer in this department he enjoyed the highest reputation during the next 24 years. "Probably no modern," says Mackintosh, "ever exceeded him in that species of eloquence which springs from susceptibility to literary beauty and moral excellence; which neither obscures science by prodigal ornament, nor disturbs the serenity of patient attention; but, though it rather calms and soothes the feelings, yet exalts the genius, and insensibly inspires a reasonable enthusiasm for whatever is good and fair." Lord Cockburn describes him as "one of the greatest of didactic orators. Had he lived in ancient times, his memory would have descended to us as that of one of the finest of the old eloquent sages." "All the years I remained about Edinburgh," says James Mill, "I used, as often as I could, to steal into Mr. Stewart's class to hear a lecture, which was always a high treat. I have heard Pitt and Fox deliver some of their most admired speeches, but I never heard any thing nearly so eloquent as some of the lectures of Prof. Stewart." It was his custom to speak from notes, not to read from full copy, a method suited to his peculiar powers, since it allowed scope to the imagination and the feelings. His aim was always moral and practical more than speculative, to portray ideal perfection and advance the harmonious culture of all the faculties, intellectual, moral, and sensitive, rather than to teach definite solutions of intellectual problems; and his lectures therefore proceeded from psychology to theories of character and manners, life and literature, taste and the arts, politics and natural theology. The prominence which he assigned to the last subject, as the highest branch of metaphysics, was designed, as he explained, to resist the prevalent sceptical tendencies of the era of the French revolution. From the beginning he gave lectures on the theory of government as a part of the course on moral philosophy, and in 1800 he first delivered a special course on the new science of political economy. He showed no marked advances beyond the doctrines of the "Wealth of Nations," but made modifications and new applications, and had the courage to canvass fundamental questions and to maintain liberal opinions before the youth of Great Britain at a time when hostility to revolutionary tendencies prejudiced all political speculation. He did not appear as an author till 1792, when he published the first volume of "Elements of the Philosophy of the Human Mind." In the following year he published his "Outlines of Moral Philosophy," and read before the royal society an account of the life and writings of Adam Smith, which was printed in the "Transactions," and was followed by his biographies of Dr. Robertson (1796) and Dr. Reid (1802). Nothing else appeared from his pen till the publication of the "Philosophical Essays" in 1810, though in this interval he prepared the matter of all his other writings, with a single exception. In 1806, on the accession of a whig administration, the sinecure office of gazette writer of Scotland was created for him, to which the salary of £300 per annum was attached. He accompanied in that year Lord Lauderdale on his mission to Paris. His health was failing, when in 1809 it received a severe blow by the death of his younger son, and in the following year he was obliged to retire from active duty as a professor, his successor being Dr. Thomas Brown. To divert his thoughts from his affliction, he interrupted his more elaborate work on the mind for the easier task of preparing the volume of "Philosophical Essays," which reached 8 editions in 7 years. He had meantime removed to Kinneil house, on the shore of the frith of Forth, 20 miles from Edinburgh, where he passed the remainder of his life. From this retreat he sent forth in succession the second volume of the "Elements of the Philosophy of the Human Mind" (1814); a preliminary dissertation to the supplement of the "Encyclopædia Britannica," entitled "A General View of the Progress of Metaphysical, Ethical, and Political Science since the Revival of Letters" (part i., 1815; part ii., 1821); the third volume of the "Elements" (1827); and the "Philosophy of the Active and Moral Powers" (1828), which was completed only a few weeks before his death. He had been struck with paralysis in 1822; but though the malady deprived him of the power of speech and of the use of his right hand, it did not impair the vigor or activity of his mind, and by the aid of his daughter as an amanuensis he continued his literary studies and exertion, until a fresh paralytic shock which soon terminated fatally. A disciple of Reid, adhering to the traditions of the Scottish school, and remarkable rather as an eloquent and elegant writer than as a profound thinker, he did not even reduce to a system the theories of his predecessors; but he rendered them attractive by profuse and exquisite illustrations, and made important improvements in phraseology and classification, especially by proposing the "fundamental laws of human thought or belief" instead of the "instinct" or "common sense" of his master.—His collected works were edited by Sir William Hamilton (10 vols., Edinburgh, 1854–'8). His lectures on political economy were first published in this edition. The last volume contains a memoir by John Veitch, with selections from his correspondence.

STEWART, John, an English traveller, born in London in the first half of the 18th century, died there in 1822. He went to Madras in 1763, in the civil service of the East India company, but at the end of two years resigned his office and commenced a series of pedestrian tours through Hindostan, Persia, Nubia, and Abyssinia, in the course of which he was at different times in the service of the nabob of Arcot and of Hyder Ali. He next walked to Europe by the way of the Arabian desert; and having perambulated every part of Great Britain, he crossed the Atlantic and visited on foot many parts of the United States. The last 10 years of his life were passed in London.

STEWART, Matthew, a Scottish clergyman and mathematician, father of Dugald Stewart, born at Rothesay, in the isle of Bute, in 1717, died in Ayrshire, Jan. 23, 1785. He was educated at Glasgow and Edinburgh, and entered the church. The favorite pupil of Simson, he assisted his master in investigating the porisms of Euclid, and, pursuing the same subject, discovered a series of ingenious and curious propositions, published under the title of "General Theorems" (1746). This work caused him to be elected the successor of Maclaurin in the mathematical chair of the university of Edinburgh in 1747, which position he held till 1772. He retired 3 years later to an estate in Ayrshire. His aim as a mathematician was to cherish the forms of ancient demonstration even for such problems as the algebraic calculus alone had been thought able to resolve. Thus he solved Kepler's problem by the methods of the ancients (1756). His other publications were "Four Tracts, Physical and Mathematical" (1761), and an "Essay on the Sun's Distance" (1763), in which he adhered to geometric simplicity, but stopped far short of the results since attained in physical astronomy.

STEWART, Robert Henry, Marquis of Londonderry. See Castlereagh.

STEYER, or Steier, a town and the capital of the circle of Traun in Upper Austria, 19 m. S. E. from Lintz, at the confluence of the Steyer and Enns; pop. about 11,000. The town proper stands between the two rivers, surrounded by crenellated walls flanked with towers; there are two suburbs on the opposite shores of the Enns and Steyer, each connected with the town by a bridge. Steyer is largely engaged in the manufacture of cutlery and hardware, and is often called the Austrian Sheffield.

STICKLEBACK, the popular name of the acanthopterous fishes of the mailed-cheeked family or *sclerogenidæ*, and genus *gasterosteus* (Linn.). They are also called banstickles, and are the *épinoches* of the French. Most of the species are found in fresh water, and are from 2 to 3 inches long; the sides are more or less protected by bony plates, the other parts being without scales; very small and crowded teeth on the jaws, none on the palate; branchiostegal rays 3; tail keeled on both sides; ventrals abdominal, reduced to a strong spine, used as a weapon, and 1 or 2 soft rays; free spines, from 3 to 15 in front of the dorsal, which is supported by soft rays; bones of the pelvis large, forming an abdominal sternum. They are very active, pugnacious, and voracious fishes, feeding on aquatic insects and worms, and the fry of other fish, in the latter way often doing great mischief in fish preserves; they sometimes spring entirely out of water. They are best known, however, for the parental care which the males take of the eggs and offspring; though Aristotle knew, 22 centuries ago, that some species of fish make nests for the reception of their spawn, it is only within the last 20 years that the fact has been generally admitted by naturalists. They breed in summer, and may be conveniently watched in aquaria, making and guarding their nests and protecting the young fry; the males are the builders, and at this season have the throat carmine red and the eyes brilliant bluish green, the other parts above being ashy green and the abdomen silvery and translucent. The nest is made of delicate vegetable fibres, matted into an irregular circular mass cemented by mucus from the body, an inch or more in diameter, with the entrance near the centre; when the nest is prepared the female is enticed or driven in, and there deposits her eggs, which are fecundated by the male; the latter remains constantly on guard, swimming in the neighborhood, driving away intruders with great ferocity, frequently putting in his head to see if all is right, and fanning the water with the pectorals and caudal to secure free circulation and ventilation for the eggs. They are frequently seen shaking up the eggs, and carrying away impurities in the mouth; the young are hatched in 2 or 3 weeks; any of the small fry getting outside of the nest are instantly seized in the mouth of the parent and put back; there are about 40 young to a nest, and if any escape far beyond its protection they are eagerly devoured by other fish of the same species always on the watch. This fish takes as good care of its young as does the hen of her chickens; for interesting details on its nidification see "Annals and Magazine of Natural History," 2d series, vol. x., pp. 241–'8 and 276–'80 (London, 1852). The common European species (*G. aculeatus*, Linn.; since separated into 3 by Cuvier) has 3 spines in front of the dorsal, and is found in almost every pool and rivulet in Great Britain; in some years it has been so abundant in Lincolnshire as to be used for manure. The *G. spinachia* (Linn.) has 14 or 15 free spinous rays on the back, and has an elongated head and body; it is a marine species, found in the northern seas of Europe. The best known of the many species in the United States are the 2-spined stickleback (*G. biaculeatus*, Mitch.), which is found from Labrador to New York, 2 inches long, olive green above, yellowish green on sides, with 2 distant spines on the back and a 3d near the dorsal; and the 4-spined stickleback (*G. quadracus*, Mitch.), of the Massachusetts and New York coasts. Other species have 8 to 10 spines, and the males in all assume the red tint in the breeding season, both in salt and fresh water.

STICKNEY, Sarah. See Ellis, William.

STIEGLITZ, Christian Ludwig, a German writer upon architecture, born in Leipsic, Dec. 12, 1756, died there, July 17, 1836. He was educated for the legal profession, but devoted himself chiefly to architectural and antiquarian studies, and published treatises on architecture (1786), on the use of the grotesque and arabesque (1792), and a history of the architecture of the ancients (1792). His most important works are: *Encyklopädie der Baukunst der Alten* (5 vols., Leipsic, 1792–'8); *Zeichnungen aus der schönen Baukunst* (1801), containing engravings of select specimens of modern architecture; *Ueber altdeutsche Baukunst* (1820), which contributed to diffuse and direct a taste for mediæval art; and a valuable *Geschichte der Baukunst vom frühesten Alterthume bis in die neuesten Zeiten* (Nuremberg, 1827). He also published poems and dissertations on literary and antiquarian subjects, and contributed to journals and to Ersch and Gruber's *Encyklopädie*.

STIEGLITZ, Heinrich, a German poet, born at Arolsen in 1803, died in Venice, Aug. 24, 1849. He completed his studies at Berlin, where in 1828 he became librarian. He married, taught in the gymnasium, published poems with moderate success, and became morbidly melancholy. His wife, who was thought to be a woman of genius, eager for his fame as a poet, and believing that only a great sorrow could restore his mind to health and activity, committed suicide in 1834, after an excursion with him in Russia. Her letters and diary were collected by Mundt in *Charlotte Stieglitz, ein Denkmal* (Berlin, 1835). Her death had not the effect which she anticipated, and from that time he is stated to have travelled hurriedly, as if accursed, from city to city, publishing occasional poems. His best productions are: *Bilder des Orients* (4 vols., Leipsic, 1831–'3); *Stimmen der Zeit in Liedern* (2d ed., 1834); and *Das Dionysusfest* (Berlin, 1836).

STIGMARIA. See Coal Plants.

STILES, Ezra, D.D., an American clergyman, born at North Haven, Conn., Dec. 10, 1727, died in New Haven, May 12, 1795. He was graduated at Yale college in 1746, and was a tutor there from 1749 to 1755. Dr. Franklin having sent an electrical apparatus to Yale college, Mr. Stiles, with one of his fellow tutors, entered with great zeal upon this then new field of philosophical investigation, and performed the first electrical experiments ever made in New England. At the same time he was pursuing the study of theology, and commenced preaching in June, 1749. In April, 1750, he visited the Housatonic tribe of Indians at Stockbridge, and preached among them so acceptably that he was earnestly solicited by the society for propagating the gospel among the Indians to take charge of the mission there, but his imperfect health obliged him to decline the proposal. He then studied law, in 1753 was admitted to the bar, and practised the profession at New Haven for the two following years. In Feb. 1755, he pronounced a Latin oration in honor of Dr. Franklin, on occasion of his visiting New Haven, and was from that time in intimate relations with him till they were terminated by death. In 1756 he became pastor of the 2d church in Newport, R. I., and during his residence there devoted himself assiduously to his professional duties, and found time also for literary and scientific investigations, corresponding with learned men in almost every part of the world. In 1767 he began the study of the Hebrew and other oriental languages, and pursued it with great avidity. His congregation at Newport being entirely broken up by the British occupation of the place, in May, 1777, he removed to Portsmouth, N. H., to become pastor of the North church. In September following he was elected president of Yale college, and shortly after professor of ecclesiastical history in connection with the presidency, and in June, 1778, entered on his official duties. After the decease of Professor Daggett in 1780, he discharged the duties of professor of divinity, beside which he gave each week one or two dissertations on some philosophical or astronomical subject. His labors for the college were intense and uninterrupted during the residue of his life. He published a funeral oration in Latin on Governor Law (1751); a Latin oration on his induction to his office as president (1778); an "Account of the Settlement of Bristol" (1785); "History of three of the Judges of Charles I." (1795); and 5 occasional sermons. His life has been written by James L. Kingsley, in Sparks's "American Biography," 1st series, vol. vi.

STILICHO, Flavius, a Roman general, assassinated Aug. 23, A. D. 408. He was the son of a Vandal officer of the cavalry under Valens, rose to high rank during the reign of Theodosius, by whom he was sent in 384 to Persia to ratify a treaty with the monarch of that country, was rewarded for his services on that occasion with the hand of Serena, the niece and adopted daughter of Theodosius, and soon became master-general of all the cavalry and infantry of the western empire. Jealousy sprang up between him and Rufinus, on whom Theodosius conferred the government of the East, which soon ripened into intense hatred. In 394 Stilicho became governor of the West, as guardian of Honorius, whom Theodosius had proclaimed Augustus; and when Theodosius died in 395, leaving to Honorius the empire of the West, and to Arcadius that of the East, Stilicho immediately passed the Alps in the depth of winter, spread terror among the barbarians by his bold and rapid operations, and having in a single summer established a firm peace on the border, returned to Milan, and prepared to march in person to Constantinople, ostensibly against Alaric and to lead back the eastern legions, but really to break the power of Rufinus. Being met near Thessalonica by a message from the Byzantine court that his nearer approach would be considered an act of hostility, he went no further, but engaged Gainas, the leader of the Gothic allies of Arcadius, to put Rufinus to death, which he accomplished in Nov. 395. Stilicho, however, gained little by this proceeding, as Arcadius fell into the hands of the eunuch Eutropius and Gainas, both of whom became bitterly hostile to himself. Several attempts were made to assassinate him, and the senate of Constantinople issued a decree declaring him an enemy of the republic, and confiscating his possessions in the East. Stilicho, who did not desire to involve the empire in civil war, made no effort to interfere with the ministers of Arcadius. In 396 Alaric ravaged the northern parts of Greece, and penetrated into the Peloponnesus. Stilicho at the head of a powerful army sailed from Italy to chastise the invaders; but Alaric escaped into Epirus, of which he took possession, and concluded a treaty with the ministers of Arcadius, by which he was made master-general of the province of Illyricum. Stilicho retired to Italy, where in 398 a marriage was celebrated between his daughter Maria and Honorius. In 400 Alaric invaded Italy, and Honorius was only prevented from flying with the court to Gaul by Stilicho, who hastened to collect his scattered troops from Rhætia, Gaul, and Germany, while Alaric seems to have been delayed by the siege of Aquileia, and to have returned to the Danube for reënforcements. In 403 that leader besieged Milan, from which the emperor fled, and the garrison was reduced to the last extremity when the rapid approach of Stilicho changed the position of the contending parties. Alaric was attacked in his camp at Pollentia, and after a bloody battle was defeated, and again soon after under the walls of Verona. Alaric now departed from Italy, and Stilicho in 404 received the honor of a triumph in Rome. Intrigues were still carried on against him in the Byzantine court, and he now formed an alliance with his late enemy against the emperor of the East. His preparations, however, were disturbed by the invasion of Italy in 405 by Radagaisus, at the head of a mixed multitude of Vandals, Suevi, Burgundians, Alani, and Goths. But while they were besieging Florence, Stilicho cut off their communications and supplies by strong lines of circumvallation, and hunger and disease forced them to capitulate. Radagaisus was put to death, and his men were sold as slaves; but the other portion of this horde, which had not entered Italy, ravaged Gaul, from which the garrisons had been withdrawn, and which Stilicho, intent chiefly on the preservation of Italy, was obliged to leave to its fate. Meanwhile Alaric had become impatient of the delay, and marching to Æmona on the borders of Italy, sent to the emperor of the West a demand for the promised subsidies. The influence of Stilicho secured to the Gothic king the payment of 4,000 pounds of gold; but a large party were indignant at his supposed partiality for the barbarians, and his power at court was also secretly undermined by the arts of the eunuch Olympius, whom he himself had introduced into the imperial palace. The latter represented to Honorius that he was without authority in his own kingdom, and that his death was meditated by Stilicho, who designed placing the imperial crown upon the head of his son Eucherius. On the death of Arcadius in May, 408, Honorius proposed to visit Constantinople as the guardian of Theodosius, the infant son of that emperor. From this project he was diverted, but he could not be dissuaded from showing himself to the camp at Pavia, filled with Roman troops and enemies of Stilicho. Immediately after his arrival there, through the agency of Olympius, the friends of Stilicho, some of the most illustrious officers of the empire, were murdered. Stilicho was in the camp of the barbarian allies at Bologna, and immediately called a council of his friends, who demanded to be led against the murderers. But he hesitated, and his friends, indignant at his want of resolution, left him to his fate. An unsuccessful attempt to assassinate him was made by Sarus, a Goth, but he succeeded in escaping, and threw himself into the hands of his enemies in Ravenna, and took refuge in a church. From this sanctuary he was led out, and no sooner had he passed the threshold than he was slain by Count Heraclian at the head of a troop of soldiers. His family and friends were persecuted, and many of them put to death, and his own name was branded with the title of public enemy, and his estate confiscated. His qualities and services have been celebrated by the poet Claudian.

STILLING, Jung. See Jung-Stilling.

STILLINGFLEET, Edward, an English author and prelate, born in Cranbourn, Dorset, April 17, 1635, died in London, March 27, 1699. He was educated at St. John's college, Cambridge, at the age of 18 obtained a fellowship, and in 1657 was presented to the rectory of Sutton. Subsequently he became chaplain in ordinary to Charles II., and dean of St. Paul's, and in 1689 bishop of Worcester. His first work, "Irenicum, or the Divine Right of particular Forms of Church Government Examined" (1659), was distinguished by a toleration inclining, as the high church party thought, toward Presbyterianism, and which he subsequently confessed "showed his youth and want of due consideration." His views however soon took another direction, and he combated Roman Catholics and nonconformists with equal energy. Of this character were his "Rational Account of the Grounds of Protestant Religion" (fol., 1664), written in vindication of Archbishop Laud's views in his conference with Fisher, the Jesuit; his "Discourse concerning the Idolatry practised in the Church of Rome" (1671), which he afterward defended against several antagonists; a sermon against the nonconformists entitled "The Mischief of Separation," which was answered by Owen, Baxter, and others, to whom Stillingfleet published a rejoinder entitled "The Unreasonableness of Separation" (4to., 1681); and a variety of less important tracts against the Roman Catholics, the Socinians, &c. He is, however, better known at the present day by his "Origines Sacræ, or Rational Account of the Grounds of Natural and Revealed Religion" (4to., 1662), which is still regarded as one of the ablest defences of the truth of revelation; and by his "Origines Britannicæ" (1685), an account of the ecclesiastical history of Britain from the introduction of Christianity to the conversion of the Saxons. After his consecration he devoted himself with great energy to diocesan reforms, and participated with distinction in parliamentary debates. He wrote several more polemical tracts and a number of miscellaneous pamphlets, and in the latter part of his life engaged in a sharp controversy with Locke on the latter's definition of substance and theory of ideas in general. His works were printed in 1710 in 6 vols. fol., to which was added in 1735 a volume of his miscellaneous works.

STILLMAN, Samuel, D.D., an American clergyman, born in Philadelphia, Feb. 27, 1737, died in Boston, March 12, 1807. His parents removed in his childhood to Charleston, S. C., where he studied theology; and he was licensed to preach in 1758, and ordained as an evangelist of the Baptist church in 1759. In 1761 he removed to Bordentown, N. J., and in 1763 to Boston, where in 1765 he became pastor of the first Baptist church, which relation he held till his death, being for many years regarded as the most eloquent and popular preacher in Boston. He was one of the founders and corporators of Brown university, and the schools of Boston were also indebted to his efforts for much of their efficiency. He was active in the promotion of all humane institutions, and was an officer of several of them at the time of his death. He was a member of the convention which framed the constitution of the United States. During his lifetime Dr. Stillman published a great number of sermons and addresses, some of which, with others previously unpublished, were collected in an 8vo. volume in 1808.

STILLWATER. See Saratoga, Battle of.

STILT, a wading bird of the avocet family, and genus *himantopus* (Briss.), so called from the length and slenderness of the legs. The bill is long, straight, slender, and pointed, with a groove on each side to the middle; wings long and pointed, 1st quill much the longest; tail short and nearly even; legs very thin and long, with scaled tarsi; toes moderate, joined at the base, with a wide membrane between the outer and middle toes; hind toe wanting; claws small and sharp; neck long. Of the half dozen species found in various parts of the world, may be mentioned two, the black-necked and the white stilt, the former American and the latter European. The black-necked stilt (*H. nigricollis*, Vieill.) is about 14 inches long, black above, with forehead, lower parts, rump, and tail white; bill black, and legs red. It is found as far N. as the middle states in spring, going S. beyond the limits of the United States in autumn; though the legs seem disproportionately long, it is a graceful bird, and frequents salt marshes in flocks of 6 to 20, delighting to wade knee-deep in search of aquatic larvæ and insects, snails, and small fry; the nests are built in company, at first upon the ground, from which they are gradually raised by successive additions; the eggs are usually 4, of a pale yellowish clay color, with large irregular blotches and lines of brownish black; though the gait on first alighting is rather unsteady, the flight is rapid and regular, the legs extending behind; the flesh is indifferent eating. The white stilt (*H. melanopterus*, Meyer) is of about the same size, and with similar habits, preferring, however, the edges of fresh water streams; it is white, with the back and wings shining greenish black, and legs red; it is found in S. E. Europe, Asia, and Africa; the bill is 3 inches and tarsus 4.

STIRLING, a parliamentary and municipal burgh of Scotland, capital of Stirlingshire, on the river Forth, 31 m. W. N. W. from Edinburgh; pop. of the burgh in 1861, 13,846. The town is built on a height at the head of the navigation of the river, which is crossed by two bridges and a railroad. Many of the public buildings are very ancient, and the castle is supposed to have been originally built by the Romans. It stands upon a rocky height more than 200 feet above the plain, and forms a conspicuous object from several of the surrounding counties. The castle of Stirling holds a prominent place in the history of Scotland, and is connected with most of the important events that occurred in that kingdom before it was annexed to England. The royal palace is still standing, in an apartment of which the earl of Douglas was mortally stabbed by James II.; and in another room the same James, as well as James V., was born. There is also a palace commenced by the latter and finished by his daughter Mary. The parliament house has been much defaced by being occupied by troops. Part of the royal chapel is used as an armory. There are several ancient churches and some modern ones within the town, beside numerous schools. The town house is very ancient, and the old residence of the earl of Mar is a very curious building. Stirling has some manufactures, the principal of which are woollens of different descriptions, leather, ropes, &c. The river is shallow, but a considerable trade is carried on. The Scottish central railway passes it, and 3 others have their termini at the town. The salmon fishery of the Forth is valuable.

STIRLING, Earl of. See Alexander, William.

STIRLING, William, a Scottish author, born at Kenmure, near Glasgow, in 1818. He was graduated at Trinity college, Cambridge, in 1839, and soon after turned his attention to the study of Spanish literature, history, and art, for which purpose he travelled and resided several years in Spain. In illustration of these subjects he has published "Annals of the Artists of Spain" (3 vols. 8vo., 1848), "The Cloister Life of the Emperor Charles the Fifth" (1852), and a life of Velasquez, entitled "Velasquez and his Works" (12mo., 1855). In 1852 he was elected in the conservative interest a member of parliament for Perthshire, which constituency he still represents.

STIRLINGSHIRE, a central county of Scotland, bounded by the counties of Perth, Clackmannan, Linlithgow, Lanark, and Dumbarton; area, 462 sq. m.; pop. in 1861, 91,926. The principal towns are Stirling, Falkirk, Alva, Bannockburn, and Denny. The chief rivers are the Forth, Avon, Kelvin, Endrick, and Carron. Half of Loch Lomond belongs to Stirlingshire. Loch Coulter, Loch Elrigg, and some others are also in the county; and the W. end of Loch Katrine forms the N. E. boundary for a short distance. Ben Lomond, in the N. W. part of the county, rises to the height of 3,197 feet above the sea. Coal and iron are mined, and woollen and cotton goods are manufactured; the iron works situated at Carron are among the largest in the world.

STIVER, a Dutch copper coin, of the value of about two cents in the currency of the United States.

STOAT. See Ermine.

STOBÆUS, Joannes, the compiler of a valuable collection of passages from Greek authors, probably born at Stobi in Macedonia, lived in the latter half of the 5th century. Stobæus called his whole work an "Anthology," and divided it into 4 books; but it has come down in a somewhat different form and as two separate works. The original 1st and 2d books are now entitled "Physical and Ethical Extracts," and the remainder the "Anthology," or by the Latin writers *Sermones*. These works, with extracts from many still extant ancient writers, contain passages from a large number of writers whose works are lost, and who are not otherwise known. A complete edition of both the "Extracts" and the *Sermones* was published by Tauchnitz (3 vols. 16mo., Leipsic, 1838).

STOCK EXCHANGE, the appellation originally given to the building in which stocks were bought and sold, but which has now come to signify transactions of all kinds in stocks. In England the term stocks is confined to the government stocks, annuities, &c., and the term shares is used for the capital or stock of railroad, banking, and other companies; but in the United States the obligations of the national debt, as well as of states, counties, and cities, and the shares of railroads, banks, mining, manufacturing, and insurance companies, are all called stocks. In France the word *rentes* has the same limitation as stocks in England. The amount of the public debt of Great Britain at the end of 1860 was £801,477,741, and the interest £26,833,469. The debt of France in 1860, of which the *rentes* are the evidences, was $1,714,000,000, and the interest on it $114,000,000. The dealing in the various stocks, bonds, and annuities is the business of the stock exchange, and the dealers in them are usually known as stock brokers and stock jobbers. In New York the traffic in stocks is of two kinds, the regular sales at the first and second boards, and the operations of the street. The first are, or are supposed to be, legitimate in their character, and the sales *bona fide*; the second are speculative in character, often illegal, and as often mere gambling or betting by parties without capital. The board of brokers in New York is composed of 200 regular members, who are men of reputed wealth, and who at their two daily sessions, either on their own account or on account of persons for whom they act, purchase or sell the various stocks which are called in order. Many of these sales and purchases are made for speculative purposes, but very seldom on account of brokers themselves. The delivery of stocks and the payment at full price is the almost invariable custom. It is only when a failure occurs that differences are fixed between members of the board. When a member of the board fails to deliver or pay for stocks as agreed, his name is struck from the list. He may be reinstated, however, upon effecting a settlement with his creditors. The efforts by one class of brokers to depreciate stocks, and by another to enhance their value, have led to the technical names of bears and bulls, and in the French *bourse* to the similar terms *baissiers* and *haussiers*. (See Bears and Bulls.) The measures resorted to for the purpose of raising or depressing values are extraordinary and not always creditable.—The stock exchange has its own peculiar terms, not generally understood by outsiders. The phrase "buyer's option," added to the memorandum of a sale of stocks, implies that the purchaser, who buys at 30 or 60 days, can at his own choice call for the delivery of the stocks at any time within the period by giving one day's notice and paying interest at 6 per cent. up to the time he calls. Such purchases are usually made at a little above the cash price. "Seller's option," on the contrary, is a little below the cash price, and the seller has the right to deliver any day within the limited time, by giving one day's notice, receiving interest up to the time of delivery. A "corner" is an operation by several brokers, who form a clique to compel others to pay a heavy difference on the price of stock. Sometimes the clique purchase gradually a large amount of stock on time, buyer's option; they next sell nearly the same amount on time, seller's option, so as to secure an eventual market for their stock; then buy for cash, thus raising the price, and make a sudden call for the stock they have purchased on buyer's option, which, if they have calculated correctly, compels the parties from whom they have purchased to buy of them at a high price in order to deliver at a low one. The operation is attended with considerable hazard. A "lame duck" is a broker who is unable to respond with the shares or money when contracts mature. A "spread eagle" is the operation of a broker who sells a given quantity of stock on time, say 60 days, buyer's option, and buys the same quantity at a lower price, on the same time, seller's option. If both contracts run their full time, he makes his difference; but if the buyer or seller compel him to deliver before the time, he may be seriously embarrassed. The "street" or "the curbstone brokers," as the board call them, though often men of probity and honor, and transacting a very large amount of business, are not governed by as strict rules, nor as careful to abide by the letter of the law. Many of them are "lame ducks." They have a room adjoining that occupied by the board, and during its sessions in communication with it. Their operations are mostly speculative, and there are few of the tricks of the trade in which they are not skilled. Few of them possess any considerable capital, and if they are successful one day, they often lose the next.—In Paris, the *bourse* is conducted on a very similar plan. There are 60 *agents de change*, 60 *courtiers de commerce*, and 8 *courtiers d'assurance*, who together make up the *parquet*, answering to the board of brokers. The *coulisse* answers to our "street." The time transactions are usually "the end of the current month," or the end of the next month. The 4th of each month is settling day. There is a class of transactions called "free or premium sales," in which the purchaser has the right on the 15th or 30th of the month to annul his contract by the payment of a small fixed sum. If he adheres to his bargain, when called upon on these days, it is then called *ferme*, "fixed." The *parquet* is in session from 1 to 3 P. M. every day; the *coulisse* is in session then, as well as before and after. The transactions of the latter are as irregular as those of our "curbstone brokers," and its premiums for annulling a sale are less than those of the *parquet*. The stock exchange at London has very similar rules, and its street operators are similar in character.—The excitement at the hour of "high 'change," in London, Paris, or New York, is often such as beggars description; several hundred men are shouting, calling out what they have to sell or what they wish to buy, at the top of their voices, all together, and leaping and gesticulating, almost as if insane; in speculative periods, immense sums are made or lost in a few minutes. Nathan Mayer Rothschild, the day after the battle of Waterloo, made, it is said, over £1,000,000 sterling in the purchase of stocks.

STOCK FISH. See Cod.

STOCK JOBBING. See Stock Exchange.

STOCKBRIDGE, a township of Berkshire co., Mass., on the Housatonic river and railroad, 168 m. by railroad from Boston, and 17 m. from Pittsfield; pop. in 1860, 2,000. The surface of the township is varied; in the S. is Monument mountain, separating it from Great Barrington, in the W. West Stockbridge mountain, in the S. E. the Beartown mountains, and in the N. W. Rattlesnake mountain. Between these are valleys of great beauty. The Housatonic and its affluents drain the town. The Stockbridge or Housatonic Indians, among whom John Sergeant and Jonathan Edwards labored as missionaries, formerly had their home here, but removed westward in 1788. There are two manufacturing villages in the township, Glendale and Curtisville, where woollen goods to the amount of $200,000 annually are made, as well as some castings, hollow ware, &c. The village of Stockbridge has a bank, an insurance office, an incorporated academy, several private schools, and 3 churches (Congregational, Episcopal, and Roman Catholic).

STÖCKHARDT, Julius Adolph, a German writer and lecturer upon chemistry and agriculture, born at Röhrsdorf, near Meissen, Saxony, Jan. 4, 1809. After receiving a classical education he studied practical pharmacy and the natural sciences for several years, and in 1833 was graduated by the board of government examiners at Berlin as an apothecary of the first class. In 1834 he travelled in Belgium, England, and France, and on his return entered as assistant the laboratory of Dr. Struve's pharmaceutical establishment in Dresden. In 1838, having received the degree of Ph.D. from the university of Leipsic, he became teacher of natural science in Blockmann's institute in Dresden, and in the following year teacher of chemistry, physics, and mineralogy in the technological school at Chemnitz, and royal inspector of apothecaries. His rare talent for presenting, both in the recitation and lecture room, scientific knowledge upon subjects which are usually exceedingly obscure to the community at large, was soon recognized both by the students and the citizens, and the remarkable power of critical observation displayed in his writings (*Untersuchung der Zwickauer Steinkohle*, 1840; *Ueber Erkennung und Anwendung der Giftfarbe*, 1844, &c.) was the occasion of almost innumerable applications for the investigation of commercial problems, and demands for his opinion upon scientific legal questions. In 1843 he travelled in Belgium and France to perfect himself in technological science, and in 1846 published his *Schule der Chemie*. In Germany new editions of this work have been published almost every year since its origin; and it has been translated into at least 8 different languages. It was translated into English by C. H. Peirce, M.D., under the title of "The Principles of Chemistry illustrated by Simple Experiments" (Cambridge, Mass., 1850). In 1844 Stöckhardt began a course of popular agricultural lectures before the Chemnitz agricultural society. The interest excited by these lectures led to the establishment of the system of agricultural experimental stations (*Landwirthschaftliche Versuchs-Stationen*), the importance of the influence exerted by which, throughout Germany, in diffusing scientific knowledge, and in bringing it to bear immediately upon the affairs of practical life, can hardly be overrated. From 1846 to 1849 Stöckhardt edited (with Dr. Hulse) the *Polytechnisches Centralblatt*, and from 1850 to 1855 (with Schober) the *Zeitschrift für Deutsche Landwirthe*. In 1848 he was appointed professor of agricultural chemistry in the royal academy at Tharand, a new chair having been founded purposely for him; and he still holds that position (1862). Since then, extending his idea of popular agricultural instruction, he has given, chiefly at his own expense, plain conversational lectures (*Feldpredigten*) in the various farmers' clubs and societies of Saxony and other parts of Germany, explaining the improvements in agriculture which chemical science has shown to be desirable, and illustrating these with experiments whenever this could be done. Several of the more important portions of these lectures have been published in a popular form by their author, as his *Guanobüchlein* (1851; 4th ed., 1856), and *Chemische Feldpredigten* (1851; 4th ed., 1857), both of which have been translated into several foreign languages; and of the latter several English editions exist, as "Chemical Field Lectures for Agriculturists," translated by J. E. Teschemacher (Cambridge, Mass., 1853), and "Agricultural Chemistry, or Chemical Field Lectures" (London, 1855). In 1855 he established at Leipsic a popular journal, *Der chemische Ackersmann*, in which his so called field sermons have since been published; and he has also contributed to various kindred publications. In 1851 he travelled through the farming districts of England, Scotland, France, and Belgium, and in 1856 through Holland and Belgium. It is said that, principally through his efforts, two bushels of grain are now harvested in Saxony where formerly but one grew.

STOCKHOLM, the capital and largest city of Sweden, in lat. 59° 20′ 31″ N., long. 17° 54′ E., 330 m. N. E. from Copenhagen, and 440 m. W. S. W. from St. Petersburg; pop. in 1861, 116,972. It is beautifully situated at the junction of Lake Mælar with an arm of the Baltic called the Skængard, the latter being more properly an archipelago indented as it were into the land. The city is built chiefly upon a number of islands, and consists of three principal divisions: the *Stad*, or original city, the *Norrmalm* (northern suburb), and *Södermalm* (southern suburb). It is handsomely designed and built, with several squares and public walks ornamented with trees and statues. The surrounding country, and much of the ground upon which the city stands, are rocky and solid; yet it has been necessary, from the nature of other parts, to build much upon piles, whence the name is derived, meaning island of piles. The city has been likened to Venice, and there are several points of view which recall the southern city of the sea; but the resemblance is imperfect. The approaches by water are uncommonly beautiful, both on the lake side and from the Baltic, commanding views probably unsurpassed of their kind. The most striking object from every point is the great rectangular palace, an immense structure, standing upon an eminence in the central island. Its vast and massive walls rise far above all the neighboring buildings, and its long straight lines need the relief afforded by the towers of the neighboring cathedral church. The palace, of Italian architecture, is a regular quadrangle, flanked upon the E. and W. sides by handsome parallel wings. There are few cities in Europe whose general aspect is more attractive than that of Stockholm. There are vast ranges of buildings, relieved and overshadowed in the Stad by the majestic palace and church towers rising from their midst, in the Norrmalm laid out with modern symmetry and elegance, and in the Södermalm rising from the harbor terraced upon a noble amphitheatre of rocky cliff, and all or nearly all reflected in the clear waves of lake and fiord. From the corner of almost every street debouching upon the wide water fronts, the eye encounters the richest and most remarkable pictures. Nowhere has nature disposed her undulations of soil and curves of water boundary with more endless variety; and nowhere does she produce effects and perspective of more striking beauty. In the compass of a single evening walk one may pass through sombre forest and smooth pasture slopes, climb tall granite cliffs overhanging glassy lake and bay, and glide through the busy seaport filled with sails and moving industry, the granite quays lined and adorned with architectural beauty, with statues and monuments of art. The various subdivisions of the city, intersected by the waters of the lake and by the sinuosities of the sea, are chiefly islands connected by bridges, some of which are of superb granite masonry. Picturesque ferry boats, propelled by Dalecarlian women in their showy provincial costume, add greatly to the originality of the scene in summer. In winter the waters are compact plains of snow-clad ice, covered with all the moving activity of thoroughfares.—The whole city is contained within a circumference of about 16 miles; but the great park, about 2½ miles in circumference and occupying an entire island nearly opposite the Stad, is not comprised within this area. It is probably the most beautiful public resort in the world. There are over 25 churches; and one of the most interesting objects in the town is the Riddarholm church, containing the tombs and trophies of many heroic personages, and among them those of Gustavus Adolphus, Charles XII., and Charles XIV. (Bernadotte). The houses of the city, about 5,500 in number, are large and convenient, usually 4 stories high, and occupied by families living independently in flats or *étages;* they are generally of brick stuccoed, and colored usually of uniform buff or yellow. Their aspect is cheerful and agreeable, but undistinguished by architectural elegance. In the principal streets, especially in the Norrmalm, there are a few elegant shops; but this species of luxury is still almost in its infancy in Stockholm. In the Norrmalm, the fashionable quarter, are the residences of the wealthy classes and of the nobility. Here the streets are wider and straighter than in most European capitals of the second class. It is so also in the Södermalm, which is the site of the principal factories. In the Stad, on the contrary, the commercial quarter, the streets, with 2 or 3 exceptions, are crooked, narrow, and dark. The city generally is sheltered from high winds. The air is pure and healthy, and the climate in all respects preferable to that of St. Petersburg. The mean annual temperature of Stockholm is 42° F., and the mean temperature of 6 winter months has been observed at 29.4° F. The harbor is one of the finest in the world, and the largest sized ships may penetrate into the very heart of the city.—As the seat of government and residence of the king, Stockholm is the central point of Swedish public affairs, of diplomacy, of several academies of belles-lettres, science, and the arts, of elegant society, and of a great number of institutions useful and charitable. There are several fine theatres and other public places of amusement. The city government is confided to a governor, lieutenant-governor, and a municipal corps composed of 3 burgomasters and 19 councillors. A strong military garrison of lifeguards is always quartered in the handsome barracks built by Charles XIV.; and there is also a burgher guard always on duty. A naval squadron, chiefly of gun boats, is stationed at an island opposite the palace, called Skeppsholm (ship island). The city, covered by a strong fortress in the neighborhood (Waxholm), is perhaps impregnable by water. By land it is quite without defensive works.—Stockholm is the chief seat of Swedish manufactures, which are here extensive, and include woollen, linen, cotton, and silk fabrics, iron ware, leather, earthenware, tobacco, refined sugar, soap, &c. Iron is the principal article of export, amounting in 1857 to 49,461 tons, in 1858 to 34,984, and in 1859 to 45,162. The other chief exports are tar, planks and boards, and copper. The imports consist principally of cotton and cotton yarn, coffee, grain, rice, hides, tobacco, wool, sugar, salt, coal, breadstuffs, and spirits. The imports of coffee in 1856 amounted to 6,087,741 lbs., of tobacco to 2,076,870 lbs., of sugar to 11,553,425 lbs., and of hides to 1,970,588 lbs. In the same year 217,026 barrels of breadstuffs were imported, and 135,817 barrels exported. The total imports in 1856 amounted to about $9,000,000, and the exports to $3,000,000. The following is compiled from the official Swedish reports of tonnage owned in Stockholm:

Years.	Vessels.	Tonnage.	Crews.
1795......................	212	39,022	2,336
1820......................	223	36,558	2,889
1840......................	150	26,048	1,160
1850......................	118	22,364	1,228
1853......................	117	23,716	1,141
1856......................	147	23,863	1 368

—The foundation of the town of Stockholm has been ascribed to Birger Jarl, the father and guardian of Waldemar, elected king in 1250. A settlement had been in existence at the spot, however, since the destruction of Sigtuna by Finnish pirates in 1187. At this epoch the island upon which the modern palace stands was originally fortified with walls and towers of wood, and the pirates were kept in check by works which thus defended 7 towns which stood on the banks of the lake. The strength of its fortifications subsequently exposed the city to repeated sieges. It became the residence of the Swedish monarchs soon after Birger's death, but Upsal continued long afterward to be the seat of government. With Lübeck and Hamburg reciprocity of free trade was established; and similar relations with Riga soon followed. Birger also sought to form commercial relations with England. On two memorable occasions Stockholm was defended by women—"Shakespearian women," as a Swedish historian aptly terms them. In 1501 the citadel was held against insurgents by Christina, queen of Denmark, whose husband, King John, ruled over the 3 united kingdoms of Scandinavia. King John had left his queen in command of a garrison of 1,000 men, whose number, after a siege of 5 successive months, was reduced by famine and the sword to 80. She was compelled to capitulate. A still more heroic defence was that originated and conducted by Christina Gyllenstierna, the widow of the fallen regent Sten Sture. The besiegers were Danes, under Christian II. After a terrible siege of 4 months, the place was surrendered with the most solemn guaranty of the king to respect the rights of the inhabitants. A most fearful massacre ensued, known as the "blood bath of Stockholm."

STOCKING, a covering of some textile fabric closely fitted to the foot and leg. The word is said to be derived from the Saxon *stican* (past participle, *stocken*), to stick, because the material was stuck, or made with sticking pins, now called knitting needles. In the 15th century the whole dress below the waist was made in one in England, and was called hose. In the next century, possibly somewhat earlier, it appears to have been first divided into breeches and stockings, which last also retained the original name. Stockings are said to have been made first of cloth in England; and such, Howell states, in his "History of the World," Henry VIII. ordinarily wore, "except there came from Spain, by great chance, a pair of silk stockins. K. Edward, his son, was presented with a pair of long Spanish silk stockins by Thomas Gresham, his merchant, and the present was taken much notice of. Queen Elizabeth was presented by Mrs. Montague, her silk woman, with a pair of black knit silk stockins, and thenceforth she never wore cloth any more." On the continent stockings were made much earlier than in England; and in 1527 there existed in France, as stated by Beckmann, a stocking knitters' guild. Nothing is known of the origin of knitting, or with certainty when it was introduced into England. It was practised there in the reign of Queen Elizabeth, and stockings were knit of worsted as well as of silk. A machine called the stocking frame for weaving them was invented in 1589 by William Lee, a student expelled from St. John's college, Cambridge, for marrying against the rules of the college, and who was thus rendered dependent upon the labor of his wife in knitting stockings. Failing of encouragement at home, he took the machine to France. After his death there his workmen brought back the invention to England, and introduced the manufacture in London and its vicinity. It was afterward established in Nottinghamshire, which has ever since been famous for its production of stockings. When Sir Richard Arkwright introduced cotton spinning at Nottingham, the first product, made of two roves instead of one, and called double spun twist, was found from its evenness so well adapted for the stocking manufacture, that it was all devoted to this purpose; hand-spun cotton was entirely laid aside, and stockings made of twist soon supplanted those of thread. It was on Lee's stocking frame that the first machine-made lace was produced in the last century, and it formed the basis of those now used in this manufacture. In 1756 an improvement was added in Derby to the machine, fitting it for making ribbed stockings like those produced by knitting, and these are still known as the "Derby ribs." The old frame, however, still continued a clumsy and complicated machine, workable only by hand; and all attempts to adapt it to power, though many were made at great cost, were abandoned in England as hopeless, until this had been successfully accomplished in the United States, as will be noticed below. The stocking manufacture is now carried on to a vast extent in the counties of Nottingham, Leicester, and Derby, England, and to a less degree in some towns in Scotland. Hawick, in Roxburghshire, produces annually between 1,500,000 and 2,000,000 pairs. The business has been greatly improved since 1844, and an immense change has of late taken place in the cheapness of the goods, so that they are introduced where stockings were before unknown. With the old hand frames a workman made in a week about a dozen cotton hose, weighing 2 lbs. The same labor now applied to a set of the power rotary round frames easily produces in the same time 200 dozen, consuming 300 lbs. of cotton, which sell at 2*s.* 6*d.* per dozen. The total number of stocking frames in Great Britain is estimated at about 50,000, of which at least 17,250, worth £810,000, are in Nottinghamshire, giving employment to about 40,000 persons in the various operations of making, stitching, sewing, finishing, &c. Those in Leicestershire give employment to about 35,000 persons. The materials used are woollen yarns, lamb's wool, cotton, silk, and mixed cotton and wool or angola.—Stocking frames were introduced into the United States in the 18th century at several places where the cotton manufacture was prosecuted. German emigrants established the knitting business at Philadelphia and Germantown, Penn., and English emigrants from Nottinghamshire introduced it into New York city and several places in the middle and eastern states. The adaptation of the old Lee machine to power was first accomplished by the ingenuity of Timothy Bailey in Albany in 1831; and the first machine thus run was at Cohoes, N. Y., in Oct. 1832. At this place the manufacture of hosiery has since become a very important branch of industry, but with machines of much more perfect construction. The old Lee invention was a square frame, which produced a straight strip or flat web, which was cut off in proper lengths, and seamed together to form the stocking. But a great improvement upon this, the origin of which is unknown, was the circular loom in which a continuous circular web is knit of any length, and which is cut up and formed by different methods into the shape of a stocking. It is believed that the first of these introduced into America was brought from Belgium into Connecticut by a German, about the year 1835. Several others of different construction have since been devised in the United States for manufacturing purposes, and a few intended also for family use.—The various knitting machines, which are too numerous to be mentioned in detail in this article, produce what is called the stocking stitch or chain work, the same as in common hand-knitting with two or more needles, or in crocheting, which consists of loops formed in succession upon a single thread, each one locked by that which follows it. The fastening of the end finally secures the whole and prevents its ravelling. These machines may be distinguished by the different kinds of needles they employ, and also by the manner in which these are arranged—whether on a straight horizontal line, all pointing the same way, as in the common stocking loom, or around an open horizontal circle, all pointing toward the centre. The latter are known as the rotary round machines. All the needles are hooked at the end, so as to hold the thread laid across it that is to form the next loop, while the loop previously formed on the same needle slips back on the shank as the needle is pushed forward, and with its return runs over the hook and off the end. The contrivance by which this is effected distinguishes the several needles. In the spring or bearded needle used in the original stocking frames, and still in common use, the hook is drawn out to considerable length and is made elastic, so that when its point is pressed down into the groove upon its shank it may spring up when the pressure is removed. In the machines this pressure is applied by means of a wheel bearing down upon the beard of the hook for an instant with the production of every loop. A very efficient rotary round machine using this needle, and introduced in many of the factories of the United States, is that invented by Mr. Goff of Seneca Falls, N. Y. A second needle is that used in the McNary patent seamless hosiery machine. It is a short slender needle with a groove upon the top of the shank, in which works a tongue distinct from the needle. This is a rotary round machine, and is distinguished for producing the whole stocking without seam. The stocking was patented in 1856, the machine in 1860, and improvements in 1861. The capacity of each machine is to produce from 2 to 3 dozen pairs of half hose per day, and one female operator of ordinary skill will tend 3 or 4 machines. Another needle is known as the latch needle, and this is used in the machines of Mr. J. B. Aiken, of Franklin, N. H. It has a very short hook, and is provided with a little tongue or latch working upon a pivot in the shank, so as to close down upon the point of the hook and thus allow the loop to run over it. The latch works back and forth as it is pushed by the loop when the needle moves first forward and then back. The first movement, sending the loop on to the shank from the hook, first throws back the latch for the loop to slide over it, and the next closes the latch upon the point of the hook, allowing the loop to run off the end of the needle. In the working of the machine, the thread while the latch is open is laid across the needle in the hook; and when the previous loop is slipped off, this serves as a new one to support the work. This consequently hangs upon the needles by a single loop upon each one. The thread as the operation goes on is rapidly carried to each needle in turn, and the movement is instantly produced that adds a new loop and slips off the old one. In the straight frames the work is done first across the needles in turn in one direction and then back in the other, and so on; but in the rotary round machines the revolution carries the needles constantly round in the same direction, each one taking up the thread in turn, and so rapidly that the movements cannot be clearly perceived. The one class of machines produces a flat web, and the other a cylindrical or tubular one, each of which hangs from the needles and is drawn down as it increases in length, by means when necessary of a weight attached to it. The number of stitches or loops which each machine can form in a minute varies with the gauge of the needles or the distance apart at which they are set. The machine of Mr. Aiken for ordinary stockings, containing 92 horizontal needles and run by power in the factories, may make from 100 to 200 revolutions per minute, producing the same number of stitches to each needle, thus amounting to 9,200 to 18,400 stitches per minute. The machines constructed for family use, and worked by a treadle or crank like a sewing machine, make about half as many stitches as the factory machines. In the factory 3 or 4 machines are easily tended by one boy. Ribbed work is performed in the same machines by bringing in play a set of vertical needles, so arranged as to work in connection with the horizontal and produce the additional stitches required. As the needles are set to a particular gauge, they necessarily produce the same number of stitches to the inch; and the only variations practicable in the work are in using yarns or threads of different degrees of fineness, and in altering the tension so as to make the work closer or more open. In the stocking frames this is of no great importance; but in the various kinds of fancy work, subject to the fluctuations of fashion, the machines adapted for special patterns may be suddenly rendered almost worthless by the demand for those patterns ceasing.—The shaping of the web to fit the foot is a matter of no little ingenuity. The flat web is either knit in long strips of sufficient width to make when turned over several stockings which are cut out from these; or the web is at once knit upon the machine in the shape required for making a stocking when the parts are properly folded over. The former is known as cut work, and the latter as regular work. In the latter the wider part, when turned over and fastened, either by lapping and sewing with the sewing machine, or by seaming with a needle and thread, forms the leg of the stocking. Two narrow strips at the base of this part, turned under and joined together upon the machine or by other means, form the heel; while a central strip twice the length of the foot, being turned over at the toe, forms the top and bottom of the foot, and is neatly united to the heel and around its edges by knitting or seaming. The cutting and fitting of the broad webs cannot be intelligibly described without the aid of drawings. In forming the foot to the circular webs after these are cut off in suitable lengths, a slit is made above the heel half across the web, which admits of the part designed for the foot being curved out at the instep. The loops along the edges of the cut are then taken up on hand needles, and the space for the heel is filled out by hand knitting, the edges being carefully united. In the same manner the toe is completed; and thus the stocking is finished without a seam. An important machine was very recently invented by Mr. Leslie of Brooklyn, N. Y., which accomplishes what has never been done before upon rotary round machines—the narrowing of the work in any manner desired.—Notwithstanding the large number of machines employed in knitting, stockings are still largely produced by the old method of hand knitting, which admits of the use of a harder and firmer yarn than that adapted to the machines; and even where the machine work is produced in large mills employing steam power, the hand looms are also in extensive use, many of them in the houses of the operatives, who work at their own hours and at their own convenience. In the factories the knitting machines are also made to produce many other articles of apparel, as undershirts, drawers, comforters, scarfs, opera hoods, talmas, nubias, gloves, mits, &c. One factory in Philadelphia, that of Martin Landenberger, employs about 500 hands, and consumes annually more than 250,000 lbs. of American wool. The total operations in Philadelphia for the year 1857 have been estimated as follows:

500 knitting frames averaging $1,657.50	$828,750
7 factories in Germantown and Kensington.....	800,000
Total value of woollen hosiery................	$1,628,750
200 knitting frames on cotton hosiery, $897 each..	179.400
Total..	$1,808,150

The other principal establishments in the United States are the factories in Cohoes, Troy, and Seneca Falls, N. Y., Paterson, N. J., and the Brooklyn knitting works, Brooklyn, N. Y.

STOCKPORT, a manufacturing and market town and parliamentary borough of Cheshire, England, at the junction of the Mersey and the Thame, 5 m. S. E. from Manchester; pop. in 1861, 54,681. It stands upon a hill, and the houses rise above each other in irregular tiers. The river is crossed by 4 bridges, and there are several suburbs, the most extensive of which are Heaton-Norris, Edgeley, and Portwood. The principal public buildings are the barracks, court house, union workhouse, and the building for the Sunday school, which is attended by nearly 4,000 children. In former times the manufacture of silk was extensively carried on here; but latterly it has been supplanted by that of cotton, for the spinning and weaving of which there are in the town and suburbs about 100 factories, employing nearly 4,000 horse power. One of these buildings is 300 feet long, 200 feet broad, and 6 stories high, and has 100 windows in each story. There are also several establishments for bleaching, dyeing, and printing cotton, brass and iron founderies, &c. Rich coal mines are worked in the vicinity, and great facilities are given to trade by the Manchester and Ashton canal, and by several lines of railway which have their junction at Stockport.—The town is believed to occupy the site of an old Roman station. Stockport castle, which has now disappeared, was held against Henry II. in 1173 by Geoffrey de Constantin. During the civil wars the town was garrisoned by parliamentary troops, was taken by Rupert in 1644, and retaken by Lesley the next year. It was occupied by Prince Charles Edward in 1745.

STOCKS, a wooden machine once universally employed in England for confining unruly persons by the feet or hands, and sometimes by both. It has long gone out of use, but is still to be seen in secluded rural districts.

STOCKS. See Stock Exchange.

STOCKTON, a town, port of entry, and capital of San Joaquin co., Cal., situated on a channel of its own name, near the San Joaquin river, and 130 m. E. S. E. from San Francisco; pop. in 1860, 3,679. It is an important commercial point, vessels of 400 tons being able to navigate the channel. It is on the main road from Los Angeles to Sacramento, and is the chief point of trade with the southern gold mines. It has 3 newspapers, several churches, and a hospital.

STOCKTON, Richard, an American statesman, and a signer of the declaration of independence, born near Princeton, N. J., Oct. 1, 1730, died there, Feb. 28, 1781. He was graduated at the college of New Jersey, at Newark, in 1748, studied law, was admitted to the bar in 1754, and rose rapidly to the first rank as a lawyer. In 1766 he visited England. He was made a member of the executive council of New Jersey in 1768, and in 1774 appointed a judge of the supreme court. In 1776 he was elected to congress, and, though at first doubtful of its policy, cordially supported the declaration of independence. In the same year he served on the committee appointed to inspect the northern army and report its state to congress, and after his return to New Jersey was captured by the British and confined in the common prison at New York. The unusual severity with which he was here treated broke down his strength, and eventually caused his death.—Robert Field, an officer of the U. S. navy, grandson of the preceding, born in Princeton, N. J., in 1796. In his 15th year, while a student in Princeton college, he entered the navy as midshipman, became an aid to Commodore Rodgers on board the frigate President, receiving honorable notice for his gallantry in several battles, and in Dec. 1814, was promoted to a junior lieutenancy. In 1815 he was sent to the Mediterranean in the Guerrière in the war against Algiers, but was soon transferred to the Spitfire as first lieutenant, in which he distinguished himself by boarding with a boat's crew an Algerine war vessel. In Feb. 1816, he was ordered to the Washington, 74, the flag ship of Com. Chauncey, cruising in the Mediterranean, and subsequently transferred to the Erie. In 1821 he was sent to the United States in command of the Erie, and was then ordered to the coast of Africa, with permission to aid the colonization society in procuring a new site for its settlement. Accompanied by Dr. Ayres, the agent of the society, he succeeded with some difficulty in obtaining from the native chiefs a treaty ceding a tract of land around Cape Mesurado, which was the original territory of the present republic of Liberia. Durring his cruise on the African coast, Lieut. Stockton captured a considerable number of slavers, and a Portuguese privateer, the Marianna Flora, of 22 guns, which had attacked him. This vessel he sent to the United States, and a series of trials followed in the United States courts as to the propriety of her capture. Lieut. Stockton was finally justified in the supreme court, but the vessel was given up to Portugal as an act of comity. He also captured a French slaver, which led to litigation, but was again justified by the court. On his return from the African coast he was ordered to the West Indies to break up the nests of pirates preying upon our commerce, in which enterprise he was successful. In 1826–'38 he was for a considerable time absent on leave from the navy, at his home in Princeton, taking an active part in politics in favor of Gen. Jackson, and also in the promotion of internal improvements in the state. In 1838 he was sent to the Mediterranean as flag officer of the Ohio, Com. Hull's flag ship, and in 1839 promoted to a post-captaincy and recalled. He had for some years given much attention to gunnery, the construction of steam engines, and naval architecture, and obtained permission from the navy department to construct a war steamer after much solicitation, the previous attempts of the department having proved failures. Capt. Stockton's plans were new, and embraced designs which the naval constructors confidently pronounced impracticable; but the steam sloop of war Princeton, commenced at Philadelphia in 1842, and completed in 1844, proved to be superior to any war vessel at that time afloat, and has furnished substantially the model for numerous others, not only in the United States, but in England and France. Her speed and sailing qualities, her admirable model, the security of her motive power, which for the first time was placed below the water line, and her powerful armament, all attracted attention. She carried 2 225-lb. wrought iron guns, made under the supervision of Capt. Stockton, beside 12 42-lb. carronades. The unaccountable explosion of one of these large guns, at Washington, Feb. 28, 1844, led to the death of 5 distinguished men, among them the secretaries of war and the navy, and seriously injured Capt. Stockton himself. The naval court of inquiry which investigated the case, completely exonerated him from all blame or want of precaution either in the construction or firing of the gun. In Oct. 1845, he was sent with a reënforcement to the squadron on the Pacific coast, in the command of which he succeeded Com. Sloat soon after his arrival at Monterey, California. Here he was placed in circumstances which in his opinion required prompt and decisive action, while communication with his government was impossible. With a force of not over 1,500 men in all, of whom about 600 were sailors from the ships of the squadron, and the remainder mostly Californian settlers, in about 6 months he conquered the whole of California, and established the United States authority there. The collision between him and Brig. Gen. Kearny in relation to the right to the supreme command there, was subsequently made the subject of a court martial. Having established a provisional government, he returned to the east, overland, in June, 1847. In 1849 he resigned his commission in the navy, and in 1851 was elected to the U. S. senate, where he strenuously opposed the project of intervening in favor of Hungary and against Austria, as desired by Kossuth, and procured the passage of a law for the abolition of flogging in the navy. In 1853 he resigned his seat in the senate, and has since held no public position.

STOCKTON, Thomas Hewlings, D.D., an American clergyman, born at Mount Holly, N. J., June 4, 1808. He began to write for the press at the age of 16, and studied medicine in Philadelphia, but in May, 1829, commenced preaching, in connection with the Methodist Protestant church. In 1830 he was stationed at Baltimore, and in 1833 was elected chaplain to congress, and reëlected in 1835. From 1836 to 1838 he resided in Baltimore, and in addition to pastoral duties compiled the hymn book of the Methodist Protestant church, and was for a short time editor of the church newspaper, "The Methodist Protestant;" but, unwilling to submit to restrictions sought to be imposed upon him in its discussion of slavery by the Baltimore conference, he soon resigned and removed to Philadelphia, where he remained till 1847 as pastor and public lecturer. He then removed to Cincinnati, and while residing there was elected president of Miami university, but declined, and in 1850 returned to Baltimore, where he was for 5 years associate pastor of St. John's Methodist church, and for 8½ years temporary pastor of an Associate Reformed Presbyterian church. Since 1856 he has resided in Philadelphia. He was again chaplain of the U. S. house of representatives from 1859 to 1861, and is now (1862) chaplain of the senate. Dr. Stockton has edited several different periodicals, and published an edition of the New Testament in paragraph form, and, beside numerous pamphlets, sermons, and occasional addresses, the following works: "Floating Flowers from a Hidden Brook" (Philadelphia, 1844); "The Bible Alliance" (Cincinnati, 1850); "Sermons for the People" (Pittsburg, 1854); "The Blessing" (Philadelphia, 1857); "Stand up for Jesus" (1858); "Poems, with Autobiographic and other Notes" (1861); and "The Peerless Magnificence of the Word of God" (1862).

STODDARD, a S. E. co. of Missouri, bordering on Arkansas, and bounded W. by the St. Francis and E. by the Castor and Whitewater rivers; area, 900 sq. m.; pop. in 1860, 7,877, of whom 215 were slaves. The greater portion of the county is level, and there are a number of swamps and shallow lakes, the principal of the latter being Lake Nicormy, 25 m. long and 4 m. wide. It is a part of the "sunk country" produced by the earthquake of 1811. (See EARTHQUAKE, vol. vi. p. 722.) Large forests of cypress abound. The productions in 1850 were 151,094 bushels of Indian corn, 17,260 of oats, 5,972 of wheat, and 38,174 lbs. of butter. Capital, Bloomfield.

STODDARD, RICHARD HENRY, an American poet and author, born in Hingham, Mass., in July, 1825. His father, a sea captain, was lost on a voyage to Sweden in the early youth of the son, who for several years worked in an iron foundery in New York. His health failing in consequence, he became in 1848 a contributor to the magazines and newspapers. In 1849 he published a volume of poems under the title of "Footprints," followed in 1852 by a maturer collection. About the same time he was married and received an appointment in the New York custom house, which he still holds (1862). His remaining publications comprise "Adventures in Fairy Land" (Boston, 1853), a series of prose tales; "Songs of Summer" and "Town and Country, a Book for Children" (1857); and "The Loves and Heroines of the Poets" (New York, 1860). He is still a frequent contributor to the periodical press.

STODDARD, SOLOMON, an American clergyman, born in Boston in 1643, died in Northampton, Mass., Feb. 11, 1729. He was graduated at Harvard college in 1662, was afterward appointed "fellow of the house," and was the first librarian of the college, which office he held from 1667 to 1674. During this time, on account of his health, he accompanied Gov. Searle to Barbados in the capacity of chaplain, and remained there nearly two years, preaching to the dissenters. In 1669 he was called to succeed the Rev. Eleazar Mather as minister of the church at Northampton, and was ordained as such Sept. 11, 1672. In Feb. 1727, Mr. Jonathan Edwards, a grandson of Mr. Stoddard, was elected as his colleague. In 1700 Mr. Stoddard published "The Doctrine of Instituted Churches," as an answer to the work of Increase Mather entitled "The Order of the Gospel," which occasioned an exciting controversy. He maintained that the sacrament of the Lord's supper is to be regarded as a converting ordinance, and that all baptized persons, not scandalous in life, may lawfully approach the table, though they know themselves to be destitute of true religion. In 1708 and 1709 the same controversy was renewed, and one or two able pamphlets on each side were written. He also published several miscellaneous and occasional sermons; "A Guide to Christ, or the Way of directing Souls in the Way of Conversion, compiled for Young Ministers" (1714); and "The Safety of appearing in the Day of Judgment in the Righteousness of Christ," which was reprinted at Edinburgh in 1792.

STOICS (Gr. *στοα*, porch), or philosophers of the porch, one of the speculative schools of antiquity, so called from the place in which their founder Zeno gave his instructions. Of their earlier representatives, the most prominent were Zeno (about 300 B. C.), Ariston, Cleanthes, Chrysippus, Zeno of Tarsus, Diogenes of Babylon, Antipater, Panætius of Rhodes, and Posidonius (probably 135–51 B. C.); of their later, Seneca (died A. D. 65), Epictetus, Marcus Antoninus, Arrian, and many of the most distinguished Roman citizens. Originally treating the three departments of logic, physics, and ethics, they are chiefly known as moralists, since they connected philosophy intimately with the duties of practical life, and taught the most complete of pagan ethical systems. In logic, they found the criterion of knowledge in sensuous impressions, which furnish the materials fashioned by reason, and combated scepticism, like the modern Scottish school, by affirming that every representation of an object implies the existence of the object itself. In physics, they inclined to pantheism, regarding God and the world as power and its manifestation, matter being a passive ground in which dwells the divine energy. But though they conceived of the Deity as the controlling reason of the universe, the earlier of them sought a material expression for this conception, and spoke of him either as a rational breath or an artistic fire. Their ethics was a protest against growing moral indifference, and had in it something of the excess of a reaction. Their aim was to transfer the theory of nature, ruled by reason, to human life. To live in harmony with nature, conformably to reason, was their fundamental maxim. Reason is impersonal, universal; hence pleasure, whose ends are individual, must be disregarded; the passions, which are not rational impulses, are to be extirpated; and a state of apathy is to be cherished, which secures liberty, the prize and quality of virtue. To be free is to act by universal reason, looking only to universal good, disengaged from anger, jealousy, envy, and hatred, and with entire self-abnegation. Thus life is rendered always uniform and equal to itself. The sage is like a good actor, who, whether he take the part of Agamemnon or of

Thersites, does it equally well. And as the divine reason is the law of virtue, every virtuous act is an act of piety; and as all things are well done in the city of God, the wise man will resign himself complacently to events. Thus there is no good but virtue, or obedience to reason, and no evil but vice. Pleasure, pain, health, wealth, life, and death are matters of indifference. Virtue depends exclusively on ourselves, and no one can take it from us; but all things else depend on others or on fortune, and the sage should be independent of them. But even the stoical apathy admitted the promptings of the heart as the impulse of nature; it did not, as Plutarch says, wish to transform men into Lapithæ of bronze and diamond; it allowed a choice in indifferent things, so far as they might enter into the account of a moral life; but it laid its stress on the inner light of duty, on resignation, piety, and tolerance. While it introduced a clear conception of absolute right, founded on universal order and harmony, it failed to furnish a system of concrete duties. Its ideal of man was a divinity without earthly relations. The asylum of heroic moralists, it exerted a private and speculative but no political influence, and regenerated nothing in Greek society. More congenial to the genius of the Romans, it became among them an ardent faith, the religion of great souls, having its devotees and martyrs, and furnished to the empire its best rulers. During the period of decline, it disputed with Epicureanism for the supremacy. The one taught love of self, voluptuous repose, intellectual relaxation, moral suicide; the other, dwelling in the sanctuary of conscience, taught love of virtue, tended to concentration and force, killed the passions. The apathy of the one proceeded from a soft abandonment to circumstances; that of the other, from an earnest effort to save the dignity of man when all the interests of society seemed to be making shipwreck. The one had no higher view than pleasure; the other, in a falling empire, conceived of a universal republic, and of law as the queen of mortals and immortals, generalized the conditions of sympathy, and proclaimed beneficence a virtue equal to justice. The stoical and Christian ethical systems have often been compared. *Stoici nostro dogmati in plerisque concordant*, said St. Jerome. Others of the church fathers spoke of Seneca as *Seneca pene noster*. Montesquieu said that, if he could for a moment forget that he was a Christian, he would not hesitate to account the extinction of the sect of Zeno among the misfortunes of mankind. Yet the two systems belong to entirely different schemes and tempers of thought, and cannot be compared in detail. There is a more direct antagonism between stoicism and utilitarianism. Bentham, after stating the doctrine that pain is no evil, and that virtue of itself is sufficient to confer happiness, adds: "This was the sort of trash which a set of men used to amuse themselves with talking, while parading backward and forward in colonnades, called porches."—See Ravaisson, *Essai sur la métaphysique d'Aristote*, vol. ii. (1837); Tiedemann, *System der stoischen Moral* (1776); and Meyer and Klippel, *Vergleichung der stoischen und christlichen Moral* (1823).

STOKE-UPON-TRENT, a town and parliamentary borough in Staffordshire, England, the latter including about ⅔ of what is commonly called the Potteries, and embracing several parishes and townships, among which are Burslem, Lane-End, Longton, Hanley, &c.; pop. of the borough in 1861, 101,303; of the town, 57,942. Stoke is situated on the river Trent, 16 m. N. by W. from Stafford, and 148 m. N. W. from London. It has very extensive manufactures of china and earthenware. The borough returns two members to parliament.

STOKES, a N. co. of North Carolina, bordering on Virginia, and drained by a branch of the Dan river; area, 550 sq. m.; pop. in 1860, 10,402, of whom 2,469 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 16,004 bushels of wheat, 223,000 of Indian corn, and 42,636 of oats. There were 6 iron forges, 19 tobacco manufactories, and 1,035 pupils attending public schools. Iron ore is abundant. Capital, Germantown.

STOLBERG, Friedrich Leopold, count, a German author, born at Bramstedt, Holstein, Nov. 7, 1750, died near Osnabrück, Dec. 5, 1819. At Göttingen, where he completed his studies (1772–'5), he was a leader in the *Dichterbund*, including Boje, Bürger, Miller, Voss, Hölty, and Leisewitz, which acknowledged Klopstock for master. In 1775 he travelled with Klopstock, Goethe, and others through southern Germany and Switzerland; in 1777 was appointed ambassador of the prince-bishop of Lübeck at Copenhagen; fulfilled a diplomatic mission in Russia in 1785; became Danish ambassador at Berlin in 1789; and, on returning from travels in Italy (of which he wrote a narrative, 4 vols., 1794), was placed at the head of the administration of Lübeck in 1791. He had already published a translation of the Iliad (1778); a volume of lyrics (1784); the *Schauspiele mit Chören* (1786), in which Theseus and Timoleon are celebrated as founders of civil liberty; and the prose romance *Die Insel* (1788), a Utopian description of a perfect republic. In 1800 he united himself with the Roman Catholic church; and his position as a statesman and scholar lent importance to this event, which appears prominently in the contemporary writings of Voss, Gleim, Jacobi, Herder, Haller, Lavater, and Schiller, and which served as an example to the younger Schlegel and others of the romantic school. His principal subsequent work was the *Geschichte der Religion Jesu Christi* (15 vols., Hamburg, 1811–'18), embracing the period from the creation to A. D. 430. It was continued by Kerz (vols. xvi. to xlvi., Mentz, 1825–'46), to the end of the 12th century, and by Brischar (vols. xlvii. *et seq.*, Mentz, 1849 *et seq.*). An index to vols. i. to xv. was prepared by Moritz (1825), and to vols. xvi. to xxiii. by Sansen (1834). He also published lives of Alfred the Great (1815) and St. Vincent de Paul (1818). His writings form the larger part of the *Werke der Brüder Stolberg* (22 vols., Hamburg, 1821–'6).—Christian, count, a German author, brother of the preceding, born in Hamburg, Oct. 15, 1748, died near Eckernförde, Jan. 18, 1821. He studied at Göttingen (1769–'74), where he was a member of the *Dichterbund*, and wrote poems, translations, and plays.

STOMACH, the hollow organ in which the function of digestion is performed, as uniformly present, in variously modified forms, in every perfectly developed animal, as it is absent in the vegetable kingdom. From the simplest form in the polyp to the complex structure in the ruminant, this organ is described under the appropriate titles, and particularly under Comparative Anatomy. As a general rule, throughout the vertebrate animals we find a complex stomach associated with a vegetable diet; but this has striking exceptions, as for instance in the dolphin, which has a multiple stomach with an animal diet, and the horse, which has a simple stomach with the same vegetable food as the ox. In man the stomach is the widest and most dilatable part of the alimentary canal; it is situated in the upper part of the abdomen, in the epigastric and part of the left hypochondriac region, below the diaphragm, above the arch of the colon and transverse mesocolon, and to a certain extent between the liver and spleen; it comes in contact in front with the anterior wall of the abdomen, and behind with the organs and vessels lying upon the spine. Its shape varies greatly, but when moderately distended, in or out of the body, resembles a bent cone, curved from before backward and from above downward, following its length; it lies almost transverse, a little obliquely downward, forward, and to the right; the anterior border is the greater curvature, and is lodged between the folds of the great omentum; the œsophagus enters at about ¼ of the length from the left extremity; the great *cul-de-sac* on the left is united to the spleen by short vessels. It is about 14 inches long, and 5 wide at the central part, tapering gradually to the pylorus on the right; its normal capacity is about 175 cubic inches or 5 pints, and its weight 6 to 7 ounces. Though naturally kept in place by the omental folds of the peritoneum, any unusual distention may displace it, chiefly in a downward direction; the habit of tight lacing sometimes gives to the stomach a permanent hour-glass shape, variously thrusting its openings from their natural positions, and greatly embarrassing digestion. The œsophagus or gullet, after passing through the diaphragm, opens into the stomach at the cardiac orifice on the left, and the digestive cavity is separated from the intestinal canal by an external constriction and an internal valve at the pyloric opening on the right. Its walls consist of 3 coats, an external or serous, middle or muscular, and internal or mucous; the 1st keeps the organ in place, limiting its movements, the 2d enables it to execute the peristaltic movements so necessary to digestion, and the 3d secretes by its glands the gastric and other juices concerned in the preparation of chyme; some anatomists count a 4th or fibrous layer between the muscular and the mucous. Between the coats are layers of areolar tissue, containing the vessels, nerves, and lymphatics; the muscles are of unstriped or organic fibre, arranged in longitudinal, circular, and oblique layers. The mucous membrane is delicate, smooth and velvety in some parts, more or less rugose in others, reddish white, covered with a mucous secretion, and rapidly undergoes disorganization; beside the usual glands noticed under Intestine, it also contains special gastric cells, whose secretion has been described under Digestion. The blood vessels are very large and numerous, the arteries coming from the cœliac axis of the abdominal aorta, and the veins emptying into the vena portæ; they freely inosculate in their branches, and are tortuous in their course and loose in their connections to accommodate the distentions of the organ. The nerves are derived from the pneumogastric, and from the solar plexus of the sympathetic system. On the introduction of food into the stomach the organ is excited to movements, the mucous membrane becomes darker and begins to pour out the gastric fluid; the food enters from the œsophagus in successive waves, and is at once subjected to the peristaltic movements which thoroughly mix the gastric juice with its mass; the act of respiration assists in the stomachal movements. The usual course of the food is first to the left of the cardiac orifice, thence along the larger curvature from left to right toward the pylorus, thence returning along the upper or lesser curvature from right to left, to go again through the same course; the revolution takes place in from 1 to 3 minutes, according to the stage of digestion; it is due probably in great measure to the action of the circular muscular fibres. The pylorus is closed during early digestion, gradually relaxing as the process goes on, allowing an almost constant passage of chyme into the duodenum; sometimes the contents pass in the reversed direction, as in vomiting, in which the cardiac orifice is relaxed, the pylorus comparatively closed, and the organ compressed by the abdominal muscles, assisted perhaps by its own contractions. The mucous membrane may be the seat of softening, congestion, hæmorrhage, acute and chronic inflammation, ulceration, and cancerous growths.

STOMACH PUMP. See Syringe.

STONE, a general term including all solid mineral substances. The subject is treated mineralogically in the article Mineralogy, and economically under the various names of useful minerals and rocks, as Dolomite, Granite, Marble, Porphyry, Sandstone, and Slate. In the present article the adaptation and uses of stone for different structures of importance will be considered. In the remotest periods durable stones were esteemed the most valuable materials for architectural purposes, and more judgment was shown in their selection, and more labor expended in their elaboration, than are exercised at the present day. It may even be said that greater skill was possessed by the architects of the most ancient monuments in carving and polishing the hardest stones than has ever since been exhibited. The ancient Egyptians, using no harder tools, that we are aware of, than those of bronze, quarried and dressed huge blocks of granite, and covered them with the most delicate and sharp-cut hieroglyphics, leaving the whole surface highly polished. Their wonderful structures are referred to more particularly in the article Pyramid; and the use of different stones by other nations of antiquity is incidentally treated in the article Architecture. It is remarkable that the ancients, with their imperfect machinery, possessed the power of quarrying and moving masses of stone as large as any moved in modern times. Structures were even hollowed out of single blocks, and transported long distances. Such was that described by Herodotus, which Amasis transported from the isle of Elephantiné to Sais, a distance of 20 days' ordinary sailing. It measured outside 27.72 by 18.48 feet, and was 10.56 feet high; within, 24.86 by 15.84, and 6.6 feet high; thus containing 2,822 cubic feet, which probably weighed 458,744 lbs. Another structure of similar character, also described by Herodotus as forming part of the temple of Latona at Buto, is estimated to have weighed 9,944,750 lbs. This enormous mass, it is supposed, was quarried upon the spot where it was placed, as no mention is made of its transportation, and as its movement would seem to be utterly impracticable; but it was covered with a block, which must have been moved and raised above its walls, described as 52.8 feet square and 5.28 feet thick, making 14,720 cubic feet, and a probable weight of 1,984,550 lbs. The largest mass of stone that has been transported in modern times is the pedestal of the statue of Peter the Great at St. Petersburg, which weighs 3,234,000 lbs. It was found impossible in moving it to make use of rollers of wood or iron, and even balls of wrought and cast iron were crushed down under the immense weight; and the last resort was to balls made of an alloy of copper, tin, and zinc. From the drawings preserved of the operations of the ancient Egyptians and Assyrians, it appears that the heavy stones which they employed were drawn by main strength of men, arranged in order along several strong ropes, upon causeways and inclined planes of cut stones specially constructed. Some were placed upon massive sledges, and drawn upon wooden ways, which were lubricated with some liquid substance, and some were moved by rolling them over. It has been estimated that a force equal to a little over $\frac{2}{3}$ of the weight of a stone is necessary to draw it, when rough, upon a firm and smooth horizontal bottom; $\frac{3}{5}$ of its weight upon a surface of wood, or $\frac{5}{9}$ if upon a wooden support moved upon wood, and if the two surfaces are soaped only $\frac{1}{6}$. The use of rollers upon ground not compressible reduces the required force to about $\frac{1}{32}$ of the weight, to $\frac{1}{40}$ if they roll upon wood, and to about $\frac{1}{50}$ if they roll between two smooth wooden surfaces. Allowing that a man can haul 1¼ times his own weight, there would be required to move the stone cover of the temple at Buto, upon smooth ground, 10,000 men; upon a surface of wood, 9,000; with the stone upon a wooden platform and drawn upon wood, 8,333 men; and if the surfaces were soaped, 2,500 men. In raising it upon an inclined plane to place it upon the walls, the increase of force required is in the ratio of its inclination.—The comparative durability of building stones is a matter of the first importance, and received especial attention in England on the occasion of selecting the best variety attainable for the houses of parliament. The effects of the weather upon some of the buildings in that country are noticed in the article Sandstone. In the United States the disintegration of building stones is exemplified in a remarkable degree in the old capitol at Washington. In a report of the secretary of the interior to congress in 1849, it is stated that some of the stones near the base of the building were so deeply affected, that it was necessary to remove them. The stone readily absorbs the moisture that condenses upon it, and the natural cement that holds the particles together appears to be dissolved, causing the material to crumble. In the words of the report: "If left wholly unprotected from atmospheric action for one fifth of the time that marble structures are known to have stood, this noble edifice would become a mound of sand. The treasury building and the present patent office building are of the same material, and, having been in no manner protected, already show signs of decay." The only remedy proposed is by some method to render, if possible, the stone permanently and absolutely impermeable to moisture. To test the comparative durability of stones, M. Brard proposed a method, which was afterward adopted by the engineers of bridges and highways in France, and was supposed in its effects to represent the action of frost. According to the directions published by a commission appointed by the royal academy of sciences for inquiring into the value of this process, the specimens to be tested are cut into 2-inch cubes with sharp edges, and boiled for half an hour in a saturated solution of sulphate of soda in an earthen pipkin. The cubes are then taken out and suspended separately by threads over cups containing a little of the solution in which the stones were boiled. The salt gradually forms small needles on the surface of the stone; and these should be washed off several times a day, for 4 or 5 days, in the cup beneath. If the stone be capable of resisting the action of frost, the crystals are supposed to abstract nothing from it; but if otherwise, small particles will drop off into the cup below, and these being collected and weighed will give the relative character as to durability of each specimen. Although experiments of this kind made in Paris agreed in their results with the effects noticed by long continued exposure of the same stones in buildings, the report on stone for the new houses of parliament (March, 1839) presents many instances of an opposite character. Some specimens well known to decay rapidly in a building disintegrated least of all; and others of the most durable quality disintegrated more than all the rest. This method of testing is consequently not to be depended upon. In fact, it appears from experience that the same stone weathers very differently in different localities; and that the atmosphere of large cities is much more destructive than that of the country. The magnesian limestone selected for the houses of parliament appears to have been satisfactorily proved at Southwell minster, in which, though exposed for 800 years, it still retains every mark of the tool; but in London it is soon found to suffer serious injury, from the effect, it is supposed, of the sulphurous acid in the smoke of the city. The softer limestones are also affected in the same way, so that it has even been necessary to resort to paint to protect Buckingham palace and other important buildings from decay. The Caen stone, it is said, endures well in lower Normandy, while it decays rapidly in Havre, and still more so in London. Some stones also are injuriously affected by the salt water atmosphere, which stand very well in the interior; some again, which are very durable if always either wet or dry, gradually give way when exposed to continual tidal changes; and others that stand well in fresh water disintegrate in salt water. Sandstones in general are least affected by heat, and limestones are readily cracked by it, and even partially calcined. Thus it appears that in selecting stones for structures of importance, special attention should be directed to the peculiar conditions to which they are to be exposed. A method of testing the durability of marbles for the U. S. capitol, adopted by the commission appointed for this purpose, was submitting them many times to the action of freezing mixtures. An account of this is given in MARBLE, vol. xi. p. 175. The mode of testing the resistance of stone to the crushing effects of heavy weights is also there described. The value of this proof in important structures can hardly be over-estimated. Prof. Walter R. Johnson states, from his experiments upon some of the marble introduced in the Washington monument at Washington, that he considers it not at all improbable that the monument will fall to pieces from its own weight before it is completed. A specimen of the stone in it 4 cubic inches in dimensions sustained a weight of only 9,000 lbs., while a single cubic inch of good material sustained 18,000 lbs. The following are results of trials made in Washington, under direction of the ordnance board, upon the resistance per square inch of some of the most important building stones of the country. Quincy granite or syenite, sp. gr. 2.648, 29,220 lbs.; Pottsdam sandstone from Malone, New York, sp. gr. 2.591, 24,105 lbs.; blue micaceous rock employed for the foundation of the new capitol broke (average of 7 samples) under 15,508 lbs. The compact red sandstone of the Smithsonian institution broke under 9,518 lbs. The strength of several marbles tested varied from 7,000 to 10,000 lbs. The sandstone of the capitol broke under a pressure of 5,245 lbs. The sandstones were tested as they are usually laid in building with the lines of stratification perpendicular to the horizon; but the marbles and granites were tested in an exactly opposite position. Mr. R. G. Hatfield of New York found that the New Jersey and Connecticut sandstones broke under pressures varying from 3,000 to 3,500 lbs. per square inch. In Europe the strength of stones has been the subject of numerous experiments, and is treated by Rondelet, *L'art de bâtir;* Gothey, *Construction des ponts*, in Rozier's *Journal de physique*, vol. iv. (1774); and by Emerson in his "Mechanics." The following are given as the weights which it is judged may be safely borne upon a square foot of the stones named, which is ⅛ of the actual crushing force:

Variety of stone.	Weight of a cubic foot, lbs.	Safe weight for a square foot, lbs.
Porphyry	179.44	640,000
"	174.90	500,000
Granite, Aberdeen blue	164.06	196,000
" Cornish	166.87	114,000
Marble, white statuary	172.50	109,000
" " "	....	57,000
" " "	168.87	88,000
" veined white, Italian	170.87	174,000
" variegated red, Devonshire	....	129,000
Dundee stone	158.12	119,000
Portland stone	151.43	82,000
Fourneaux pillars of All Saints church at Angers	160.68	110,000
Bagneaux pillars of Pantheon at Paris	187.12	62,000
Stone of temples at Pæstum	140.87	58,000
Derbyshire grit, a friable red sandstone	144.75	56,000
Tufa from Rome	76.00	15,000
Chalk	....	9,000
Brick, hard, well burned	97.81	84,000
" pale red	130.81	10,100
" red	135.50	14,500

The following are weights actually borne upon the square foot of stone in some buildings: the pillars of the church of All Saints at Angers, named in the table, support on each superficial foot a pressure of 86,000 lbs.; the Bagneaux stone in the pillars of the dome of the Pantheon at Paris, 60,000 lbs.; a red sandstone pillar in the centre of the chapter house at Elgin, 40,000 lbs.; the piers under the dome of St. Paul's in London, 39,000 lbs.; those under the dome of St. Peter's at Rome, 33,000 lbs. (See STRENGTH OF MATERIALS).—The methods of extracting stones from their beds are described under each variety (see also BLASTING); the mode of shaping blocks of stone by sawing in the article MARBLE, and of polishing in LAPIDARY. The dressing of blocks of stone is usually performed with wedge-shaped hammers by hand, the surface being gradually reduced by light blows, each one being struck in regular order close to the points abraded by the preceding blow. The work upon hard stones is necessarily laborious, and machines have been devised in England and in the United States for accomplishing it by steam power upon several plans. By one method large masses of hard stone are cut by a series of chisels, which follow each other in the same track, each striking a heavy blow, and which are fixed to a frame that travels on a kind of railway. Pavement slabs are cut in Dean Forest by revolving disks, 10 or 12 feet in diameter, which carry on the periphery 20 or 30 cutters. A machine devised by the earl of Caithness, for dressing the surface of hard slabs for street pavements, consists of about 30 iron bars standing vertically by the side of each other and each toothed at the bottom; these are raised successively and fall heavily upon the stone, which is carried along slowly beneath them. The following is an account of a very efficient machine invented by Mr. Charles Wilson of Springfield, Mass., for dressing sandstone. Broad wheels or cylinders are made by placing 8 to 12 disks of steel, 7 inches in diameter, and as thick as a common circular saw of that size, alternating with iron washers ¼ of an inch thick and ½ inch less in diameter than the disks. Two such cylinders are adjusted upon their axes so that the cutters stand at an angle of about 25° with a horizontal line, and are then caused to revolve in an "iron head," which passes quickly back and forth across the stone as this is moved slowly along upon its carriage, like that used in saw mills. A rough block of 6 superficial feet has been smoothly dressed in this way in 8 minutes. Marble and other soft stones are sometimes cut into parallel slabs by circular cutters of this kind set upon a horizontal axis, at distances apart equal to the intended width of the strips. Circular pieces are sometimes cut by means of chisels fixed to the ends of revolving horizontal arms. Small circles have been cut with hollow cylindrical chisels made to revolve upon their axes; in this way pillars have been made, and hollow cylinders or tubes of stone. (See PIPE, vol. xiii. p. 346.) Stones are sometimes turned in lathes shaped with cutting tools; and mouldings upon flat stones are produced by running the stones through lathes upon which are fixed the tools, sometimes of iron, having the counterpart shape of the moulding to be made. Such tools may be fed with sand and water.—The want of durable building stones in certain localities, and the extreme labor of dressing them, have led to many attempts to produce artificial substitutes, that might be moulded from liquid or plastic compounds, and which should afterward become solid and durable; and also to produce certain applications which should harden and render more permanent soft stones that are easily dressed. Bricks are successful substitutes for stone, and pottery and terra cotta have been produced in various forms applicable to architectural purposes. The cinders of iron smelting furnaces have also been run into moulds, and strengthened by slow cooling, with the same object; but this application does not seem to have succeeded. It has been also proposed to mould the alkaline solutions of silica (see SILICATES, SOLUBLE); but their employment seems likely to prove more beneficial in coating the softer stones. Ransome's process, recently introduced into England, by which he produces artificial stones for a great variety of purposes, as grindstones, whetstones for scythes, mouldings, &c., for decorations, tombstones, tablets, and chimney pieces, consists in moulding a mixture of 10 parts of sand, 1 of powdered flint, 1 of clay, and 1 of the alkaline solution of flint, after they have been thoroughly kneaded into a putty-like consistence. The proportions of the ingredients vary with different articles. The moulds are generally of plaster of Paris, oiled over and dusted with finely powdered glass, and the compound is rammed into them with a stick. When the casts are taken out, they are first washed over or floated with a diluted solution of the silicate. To cause the casts to dry equally and to prevent the formation of an external crust impervious to the moisture from the interior, the ingenious expedient was adopted of placing the articles in a close chamber heated by steam, into which a jet of steam is admitted, until the stones attain throughout a temperature of 212° or more. The vapor then being allowed to escape slowly from the chamber, the stones are left uniformly dried. A variety of stony mixtures have been compounded so as to resemble many of the natural stones, and the materials have been held together by cements of different sorts; but none of them have ever been brought into extensive use. The external applications proposed (beside the soluble silica) for protecting the surface of stones are numerous. The most promising of these seem to be of oily, fatty resinous matters, which the stone is made to imbibe, sometimes by being boiled in them. Gutta percha, quicklime, copperas, and various other substances have also been introduced into the preparations. Patents were taken out in England in 1856 for applications, first of a solution of sulphate of zinc or of alum, followed by one of sulphur in oil; and another for a solution of wax in coal tar, naphtha, &c.

STONE, the common name of calculus in the urinary bladder, for the composition of which see CALCULI and GRAVEL. The prominent symptoms are irritability of the bladder, with frequent irresistible desire to pass water, and occasional stoppage of the stream, with pain in various parts of the urinary system; none of these, however, can be depended on, the only sure diagnosis resting on making the stone perceptible to the ear and fingers by means of a metallic sound introduced through the urethra, and brought into direct contact with the foreign body; even with this instrument, several introductions in various positions of the body are sometimes necessary for its detection. The symptoms vary in intensity according to the size and roughness of the stone, the state of the urine, and the condition of the bladder. Stone may be formed from the urine and from the mucus of the bladder, the latter being always phosphatic; all stones become coated with phosphates if they remain long enough to produce inflammation of the mucous membrane; the phosphatic are the largest stones. Supposing all methods for correcting the diseased condition of the urine and for removing pain and irritation to have been used in vain (see GRAVEL), the only other remedy is to extract the foreign body; this may be attempted in 4 ways, extraction through the urethra, solution by injections into the bladder, lithotomy (Gr. λιθος, stone, and τομος, incision), and lithotrity or more properly lithotripsy (Gr. λιθος, and τριβω, to grind). Extraction by the urethra was employed by the Egyptians centuries ago; it is practicable only for small stones, and especially applicable in females, where the canal is short and nearly straight; in favorable cases, when the irritability of the bladder has been diminished and the organ filled with fluid, the urethra may be dilated by bougies, and small stones be extracted by forceps made for the purpose. Sir Benjamin Brodie has shown that phosphatic calculi may be sometimes entirely dissolved, or so disintegrated as to escape by the urethra, by the injection of very dilute nitric acid; uric acid calculi are more rebellious to this treatment, and the oxalic entirely so. Both these processes are less employed, as the other two methods are more certain, and generally unattended with danger. If the stone be large, sacculated, or very hard, the urethra strictured, the prostate gland enlarged, the coats of the bladder diseased, or the patient very weak and irritable, most surgeons would employ lithotomy in preference to lithotrity; both these operations are comparatively rare on the Atlantic seaboard of the northern states, but very common in the western and middle states, where limestone strata take the place of the granitic rocks. Supposing the operation not to be contra-indicated by organic disease, and the general and local condition of the organs to be as good as possible, lithotomy may be performed in 4 ways, called respectively the lateral, bilateral, recto-vesical, and high or hypogastric operations. The lateral operation is in general the best, and it may be performed as follows: a grooved steel staff or sound of full size is introduced, the bladder being moderately distended, the patient on his back, with shoulders elevated, thighs separated widely in order to expose the perineum, the hand grasping the foot and bound together; the patient being etherized, an incision is made on the left side of the perineum from about an inch before the anus downward and outward to a point midway between the anal opening and the tuberosity of the ischium, the muscular fibres being divided down to the staff; the groove is carefully entered by the knife or gorget, the lascia divided forward, and the urethra perforated a little in front of the prostate, the rectum being thrust back by a finger in the incision; the knife is gently pushed into the bladder, slitting up the urethra and dividing the prostate for about half an inch; the finger is then introduced, dilating the opening; the finger being withdrawn, the forceps are introduced, opened, and the stone seized, if possible, with the first gush of fluid from the wound, and then extracted by slow, steady, and undulating movements, dilating and not tearing the soft parts. If properly performed, and the after treatment not interfered with by hæmorrhage, inflammation, sloughing, or other complications, the urine begins to flow by the urethra in about a week, and the wound heals completely in 4 or 5 weeks. In the bilateral operation, a curved incision, with the convexity upward, is made from one side of the perineum to the other, between the anus and the urethral bulb, dividing both sides of the prostate by a double bistoury; the recto-vesical operation consists in cutting into the bladder from the rectum on the median line behind the prostate; and in the high operation the bladder is opened above the pubes through the linea alba, where there is no covering of peritoneum; the last is resorted to when the stone is of great size, the prostate enlarged, or the tuberosities of the ischia too near together. Lithotomy was practised 25 centuries ago; Hippocrates bound his pupils by oath not to practise it, but it came into use again in the time of Celsus, in whose writings are found the first indications of the bilateral operation; the lateral operation was first practised toward the end of the 17th century; the recto-vesical method was first employed by Sanson.—Lithotrity has for its object to reduce a stone in the bladder by crushing it into fragments so small that they may be expelled by the urethra. The early instruments used for this purpose were very rude and dangerous, the stone being grasped by branches made to protrude from a straight catheter, and then bored by a drill extending through the instrument and worked by a watchmaker's bow; after it was bored it was crushed by another complicated instrument. The next improvement was introduced by Heurteloup in 1830, which consisted in seizing the stone in curved forceps, the anterior sliding in the posterior blade, and then breaking it to pieces by blows applied outside with a hammer; the instrument was liable to be bent or broken, and the urethra and bladder to be wounded by it or the fragments of the stone. The instrument now used is composed of two sliding blades, introduced in the shape and after the manner of a sound, between which the stone is seized, and then crushed by the gradual pressure of a screw; the fragments may then be washed out by injections or by the urine, large pieces being again broken by the same or a smaller instrument. This operation, by variously modified instruments, is generally preferred to lithotomy, as easier, safer, applicable in a greater variety of cases and at all ages, and quite as effectual.

STONE, a new S. W. co. of Missouri, bordering on Arkansas, intersected by White river, and drained by its tributary the James; area, about 500 sq. m.; pop. in 1860, 2,401, of whom 16 were slaves. The surface is broken and the soil fertile. Capital, Galena.

STONE, Frank, an English painter, born Aug. 23, 1800, died Nov. 16, 1859. He originally painted in water colors, and in 1837 became a contributor to the exhibitions of the royal academy. Subsequently for more than 20 years he produced many works in *genre* and history, and on subjects of sentiment and imagination. Some of these are well known by engravings, particularly the companion pieces entitled "The First Appeal" and "The Last Appeal," once very popular. He was elected an associate of the royal academy in 1851.

STONE, Thomas, a signer of the declaration of independence, born at Pointon Manor, Charles co., Md., in 1743, died in Alexandria, Va., Oct. 5, 1787. Having studied law, he commenced practice at Frederictown, Md., in 1769, and in 1771 removed to Charles co. In 1774 he was by a vote of the provincial deputies added to the Maryland delegation in congress, and in 1775 was rechosen. He strongly favored the establishment of an independent government, although under instruction from the Maryland convention to oppose it; but that state receded from its opposition in time to allow its delegates to sign the declaration. He served on several committees, including that charged to prepare a plan of confederation. Reëlected to congress in 1777, he saw that plan accepted, declined another election, and became a member of the Maryland legislature, where the measure was still opposed. In 1783 he was again elected to congress.

STONE, William Leete, an American journalist and author, born at New Paltz, Ulster co., N. Y., April 20, 1792, died at Saratoga Springs, Aug. 15, 1844. When a child, his father removed to the valley of the Susquehanna. The son received from him thorough instruction in Latin and Greek, and at the age of 17 entered a newspaper office at Cooperstown to learn the printer's trade, and soon began to write newspaper paragraphs. In 1813 he became the editor of the "Herkimer American," and subsequently edited political newspapers at Hudson, Albany, and Hartford. In the spring of 1821 he became editor and one of the proprietors of the New York "Commercial Advertiser," which position he retained till his death. Though possessing decided ability as a political writer, Col. Stone (as he was always called) preferred literary pursuits to partisanship. In 1825 he was appointed by the corporation of New York to write the narrative of the "Grand Erie Canal Celebration." His tales and sketches published in the annuals were subsequently collected in 2 volumes. "Ups and Downs in the Life of a Distressed Gentleman" (1836), a satirical work, was very successful. Among his more elaborate works were "Letters on Masonry and Anti-Masonry" (8vo., New York, 1832); "Border Wars of the American Revolution" (2 vols. 18mo., 1834); "Matthias and his Impostures" (18mo., 1835); "The Life of Joseph Brant" (2 vols. 8vo., Cooperstown, 1838); "Life and Times of Red Jacket" (8vo., New York, 1840); "The Poetry and History of Wyoming" (16mo., 1841), and "Uncas and Miantonomoh" (12mo., 1842). At the time of his death he was engaged upon a life of Sir William Johnson.

STONE BORER, a name given to several bivalve shells, especially *pholas* (Linn.) and *lithodomus* (Cuv.), from their power of boring into the hardest rocks. The *pholadidæ* (Gr. φωλεω, to hide in a hole) are true bivalves, and have 2 accessory plates in the neighborhood of the hinge for the protection of the dorsal muscles; they belong to the group *siphonophora* (Gray), or those having long respiratory siphons, united for the greater part of their length; they are all burrowing animals, penetrating the hardest substances. The shells are usually elongated, gaping at one or both ends, and closed by 2 adductor muscles; the foot is large and powerful, and the mantle is closed; they are found in all climates. The typical genus *pholas* is often of considerable size, with a white, hard, rough, but very brittle shell, rendering it an interesting question how it can perforate a solid rock; the operation in this case is supposed to be performed by a rotatory motion of the shell effected by the powerful foot. The date shell (*P. dactylus*, Linn.), about 2 inches long and 6 or 7 wide, is found along the European coast, mostly in calcareous rocks; it is eaten along the Mediterranean. The *P. candida* (Linn.), a much smaller species, is extensively used for bait on the coast of Devonshire. The *P. costata* (Linn.), a large species from the West Indies, is sold for food in the markets of Havana. The *P. crispata* (Linn.), much smaller, is found along the coasts of our middle and southern states. Many fossil species are known. The family of *veneracea*, of the same group, are also stone borers, principally by means of the foot.—Among the asiphonate bivalves, the most remarkable stone borer is the *lithodomus lithophagus* (Cuv.); it is commonly found in holes which it has excavated in calcareous and coral formations; it is the sea date shell of the Mediterranean, and is a delicate article of food. Its perforations have served as important indications of the change of level of the sea coast in modern times; the columns of the temple of Serapis at Puteoli are perforated by these shells at a considerable height above the actual level of the sea.—Another bivalve, coming near the clams, generally considered a stone borer, is *saxicava* (Lam.), which appears under such a variety of forms that 2 genera and at least 15 species have been made of the single representative *S. rugosa* (Lam.); the young symmetrical form constitutes the genus *hiatella* (Bosc). It is found in almost all parts of the world, largest in the arctic seas, in crevices of rocks and corals, assuming very exactly the shape of the cavity which contains it; it occurs from low water mark to the depth of 140 fathoms; it is found fossil in the miocene and glacial deposits. It has been questioned whether *saxicava* is the excavator of the holes in which it is found, and the subject of the mechanism by which the stone borers operate is by no means well understood.—The *pholas* bores into the hardest stone by means of its rough rasping shell, but *saxicava* is smooth, covered with epidermis, and has a very small foot; accordingly some have supposed that a peculiar acid is secreted in many cases, capable of acting chemically on the rocks, and of so softening them that the branchial currents wash away the particles; while others have called into play the thickened anterior margins of the mantle, covered with silicious grains which act like a rasp. The perforations made in shells by *natica* seem more like chemical than mechanical action, the solvent being most concentrated where it is immediately used, and not necessarily acting, in its otherwise diluted state, on the shell of the animal secreting it; the excavations of *saxicava* are attributed also to the action of the brushes of vibratile cilia along the edges of the mantle. After all the explanations offered, it is possible that the excavations are only occupied, not made, by *saxicava;* the finding of this shell, and *crepidula*, *petricola*, &c., in cavities which fit them exactly, may be rather an evidence of a power of adaptation of their external form to the cavities into which they enter than of ability to perforate.—Sea urchins also may in many instances be called stone borers, the excavation of their cavities being effected by the constant action of their spines, and perhaps also by the vibratile cilia of their ambulacral tubes and suckers. It is conceivable, if not probable, that the continual action of soft vibratile cilia may excavate holes even in the hardest rocks.

STONE-CHAT (*saxicola rubicola*, Bechst.), a dentirostral bird of the warbler family, and sub-family *erythacinæ*, or old world robins. The bill is short, with broad gape furnished with bristles; wings long and rounded, with 4th and 5th quills equal and longest; tail short and broad; tarsi and toes slender, and hind toe long. There are several species of the genus; they prefer open and rocky grounds covered with furze, and are usually seen singly or in pairs hovering about these bushes and from stone to stone, uttering a quick but agreeable chattering song, which has given the above name to the best known species; the food consists of worms and insects, the latter being generally seized on the wing in the manner of the flycatchers; the nest is on or near the ground, carefully concealed, and the eggs 6. The stone-chat is about 4½ inches long; the head, throat, and back black, on the latter edged with whitish red; sides of neck, upper part of wings, and rump, white; breast orange brown; lower parts reddish white. It is resident in England, but migratory on the continent. A similar but migratory species is the whin-chat (*S. rubetra*, Bechst.), so named for its partiality for furze or whin bushes; it is 4½ inches long, with the top of the head and upper part of the body blackish brown, each feather bordered with reddish and yellow; broad band above eyes, stripe on sides of neck, and large spot on wings and tail, white; breast rose-colored; 2 middle tail feathers dusky. These 2 species belong to the subgenus *pratincola* (Koch). Another European species (*S. œnanthe*, Bechst.) sometimes straggles into North America from Greenland; it is called stone-chat by Baird, but is more properly styled the wheatear.

STONE LILY, the popular name of the fossil radiated animals of the class of echinoderms and order of crinoids, and especially of the group called encrinites. They have some resemblance to petrified lilies in the plates at the base of the body, bearing the arms and their divisions, and supported on a long, jointed stem. The perforated joints of the stem are used in rosaries, and are known in the north of England, where they are abundant, as St. Cuthbert's beads. Most of them are fossil forms, very numerous during the secondary epoch, vast strata of limestone and marble in North America and Europe being formed by the myriads of their petrified remains. They were attached at the bottom of the sea, the flexible stems yielding to the force of the waves. The genus *pentacrinus* is found living in the West Indies. (See CRINOIDEA, and ENCRINITE.)

STONEHENGE, a collection of huge stones on Salisbury plain, Wiltshire, England, about 9 m. N. from Salisbury. Seen from a distance, they appear to be merely an irregular mass of stones, but a closer inspection shows them to have originally constituted a rude architectural structure, arranged in two circles and two ovals. There are altogether about 140 stones, the smallest estimated to weigh 10 or 12 tons, and the largest 70 tons. They are much weather-worn, but in many of them the sharp angles and the tenons and mortices by which they were joined are well preserved. Most of those on the outer circle are standing, and the whole work is surrounded by a circular earth embankment 15 feet high, and a trench 30 feet wide and 1,009 feet in circumference, and approached by a straight avenue similarly formed 594 yards long, divided into two branches at its outer extremity. There are other earthworks and numerous ancient barrows or burial mounds in the neighborhood. In the centre of the work is a massive slab of fine sandstone, supposed to have been an altar. Among the ruins have been found the relics of human bodies, and of oxen, deer, and other animals.—Stonehenge has given rise to much speculation and discussion among the learned in regard to its origin and purposes. History throws no light upon the subject. According to Geoffrey of Monmouth, it was erected by order of Aurelianus Ambrosius, the last British king, in honor of 460 Britons slain by Hengist the Saxon; but Polydore Vergil argues that it was a monument to the memory of that king. Inigo Jones believed it to have been a Roman temple, and Rickman attributes it to the post-Roman period. Dr. Charleton conjectured that it was built by the Danes during their temporary possession of Wiltshire. The theory best sustained by antiquaries and most plausible is that it was a druidic temple.

STONINGTON, a town and port of entry in New London co., Conn., at the E. extremity of Long Island sound, 63 m. E. from New Haven, and 50 m. S. S. W. from Providence; pop. in 1860, 7,740. It is built upon a peninsula nearly a mile long, and has a commodious harbor protected by a breakwater. It has a flourishing coasting trade, and was formerly largely engaged in whale fishing. On June 30, 1860, its shipping amounted in the aggregate to 19,587 tons, of which 7,305 tons were registered, and 12,282 enrolled and licensed; and 2,484 tons were engaged in whale fishing, 10,063 in the coasting trade, and 1,741 in the cod fisheries. There are 3 banks, a savings bank, a newspaper, 12 churches, and a number of manufactories of various kinds. The New Haven and Stonington railroad connects it with New Haven and New York, and the Stonington and Providence railroad with Providence and Boston.—The town was settled in 1649, and incorporated in 1807. On Aug. 9, 1814, it was attacked by the British fleet under Sir Thomas Hardy, and during that and the next day several attempts were made to land; but the militia speedily gathered and compelled the enemy to retire.

STONY POINT, a small rocky promontory on the right bank of the Hudson river, in Orange co., N. Y., 42 m. N. from New York, at the entrance of the highlands, and opposite Verplanck's Point. On both these points forts were built by the Americans during the revolution, which were captured by Sir Henry Clinton, June 1, 1779, strengthened, and strongly garrisoned; but that on Stony Point was retaken by a bold night attack under Gen. Anthony Wayne, with 550 men, July 16, and the garrison of 543 officers and men made prisoners. The Americans had 15 killed and 83 wounded, and the British 63 killed. The simultaneous attack on Verplanck's Point having failed, the works on Stony Point were destroyed and abandoned on the 18th.

STOPPAGE IN TRANSITU, in law, the arresting by the seller of goods on their passage to a distant purchaser who has become insolvent. Though the right to do this originated with and is still most frequently exercised in respect to water-borne goods, yet it is well settled that it applies as well in the case of goods carried by land. When and how the doctrine of stoppage in transitu became a part of our law cannot be definitely asserted. As to the time, its introduction was comparatively recent; as to the mode, it may have been in either of three ways: 1, by adoption from the continental law of that principle of the law of sales which considers that the right of property (the *jus in re*) does not pass to the buyer until he has possession of the goods, so that the seller continues to own the goods until they reach the buyer; 2, by supposing that the seller had, until the goods reached the buyer, a right to rescind the sale for non-payment, provided the buyer became insolvent, and that the act of stoppage in transitu was an exercise of the right. This last was at one time rather a favorite view, but the prevailing course of adjudication in the United States is decidedly against it. The third way is by considering that the common law doctrine of the seller's lien for the price on the goods sold so long as he has them in his possession, continues in force after they have left his possession, and until they have reached that of the buyer; or, in other words, that the goods are considered constructively in the possession of the seller until the buyer has actual possession. Perhaps a combination of the first and third of these ways will best account for the right of stoppage in transitu as it exists in the English and our own law; that is to say, the rule of the civil or continental law, recommending itself by its reason and justice, established itself in the law merchant. When, as a part of that system, it came to the observation of the English courts, they recognized its reasonableness, and sought to support it by some familiar principle of the English law. This they found in the law of lien and in the continued constructive possession of the seller; and upon this law, and adopting its general principles, they founded the law of stoppage in transitu.—The right exists only between a buyer and a seller. A surety for the price of the goods, bound to pay for them if the buyer does not, has not this right; but every one who is substantially a seller has. Thus, one ordered by a foreign correspondent to buy goods for him, and then buying them in his own name and on his own credit, and sending them as ordered, may stop them *in transitu*. So may a principal who sends goods to his factor, or one who remits money for any particular purpose. The reception and negotiation of a bill for the goods does not defeat the right, nor does part payment. But goods cannot be stopped when they are sent to pay a precedent and existing debt.—The right arises only upon actual insolvency, which however need not be legal or formal bankruptcy or insolvency. It is enough if the buyer cannot pay his debts; and it is enough, too, if the buyer refuses to comply with the specially agreed terms of the sale, for this is insolvency so far as the seller is concerned. When the goods are stopped, the buyer may, by payment of the price or by tender of security if they were sold on credit, defeat the stoppage and reclaim the goods. If the seller stop the goods maliciously, and without actual belief of the insolvency on good grounds, he would doubtless be answerable for any damages which the buyer might sustain. The seller's right to stop the goods cannot be defeated by any bargain between the consignee and his assignee, or by any claim or lien or attachment of any other person. In some cases it may be necessary for the seller to discharge the claim before he can have complete control of the goods, as for example in case of a lien for freight; but this is not necessary when the attachment is by a creditor of the buyer or consignee, because the seller's lien has the precedence.—Nice questions have arisen in respect to the *transitus*. Generally speaking, the goods are in transit when they are not in the actual possession either of the buyer or of the seller. But the law goes sometimes further than this, and inquires into the constructive possession; for the goods may be in the actual possession of the seller, and yet so far constructively in the possession of the buyer that the seller cannot retain them; or they may be in the actual possession of the buyer, but under such circumstances that the seller's right is not taken away. It becomes, therefore, very important to ascertain in many instances whether the transit is or is not complete. A carrier of goods, by land as well as by sea, acquires a lien on the goods which he carries for the freight money. The goods are still in transit, and may be stopped, so long as the carrier withholds them from the buyer by his lien for the freight, and a seller who seeks to stop them then must discharge this lien. In general, whenever a carrier enters into a new arrangement with the consignee, by which he agrees to hold the goods as the property of the consignee and at his disposal, there is a termination of the transit. Yet all acts in reference to such question must be open to explanation by existing circumstances, the general inquiry in such case being whether the carrier, warehouseman, wharfinger, or other person having actual possession of the goods at the time of the intended stoppage in transitu, was then acting as the agent of the seller or of the buyer; for if of the latter, the transit was terminated. If the buyer order the goods to be sent to some other person by any suitable conveyance without designating any one especially, or by a designated carrier who is not specifically his agent or servant, the goods remain in transitu until they reach that second person. Questions of constructive possession arise very frequently in respect to goods in the charge of warehousemen. In general, every warehouseman is the agent of any party who puts the goods in his warehouse and can take them out at his pleasure; and therefore his possession is the possession of such party. This is carried so far, that where a seller had a warehouse, and it was part of the bargain of sale that the goods might remain in his warehouse until the buyer took them out, without charge, and they remained there after the sale under this bargain, it was held that the actual possession of the seller was the constructive possession of the buyer, and that the seller could not stop or retain them for the price. On this point it is a material question whether any thing remains to be done by the seller; if nothing, this goes far to make the warehousing a delivery to the buyer. If a seller of goods that are warehoused delivers an order for them to a buyer, this alone may not transfer the possession; but if the buyer delivers the order to the warehouseman, this in general transfers the possession, and still more so if the warehouseman enters the same in his books or otherwise accepts the order, so as to be responsible for the goods to the buyer. If the buyer sells to a third party, to whom the warehouseman certifies that the goods are transferred to his account, and who thereupon pays the price, the warehouseman becomes responsible to this third party; and if the original seller, though there remained something material to be done by him to the goods, justified the warehouseman in so certifying, he would be held to have lost his right of stoppage in transitu.—The effect of the bill of lading upon the right of a seller to stop the goods in transitu is very important. The law merchant regards the bill of lading, not as a mere receipt which the carrier gives for the goods, but rather as a muniment of title, carrying property with it, and of itself a negotiable instrument. This view, in its entire breadth, the common law has not yet adopted. It admits, however, that the bill of lading is *quasi* negotiable, and that an indorsement and delivery of it for value operate as a symbolic delivery of the goods mentioned in it. It results from this doctrine that a consignee, who sells for value goods to arrive and indorses over the bill of lading, confers upon the purchaser a title and property which destroy the right of the seller of the goods to stop them *in transitu*. If, however, the party buying from the consignee knows that the sale is in fraud of the original seller, it is voidable by that seller of course; and if he knows that the consignee is, or is about to become, insolvent, this knowledge would probably have the same effect. Generally, the purchaser's claims will be defeated, not only by his knowledge or adequate means of knowledge of the consignee's fraud, but by knowledge or notice of any circumstances which rendered the bill of lading not properly assignable. If the bill of lading be transferred and indorsed by way of pledge to secure the consignee's debt, the consignor does not lose entirely his right to stop the goods, but holds it subject to the rights of the pledgee. That is, he may enforce his claim to hold the surplus of the goods after the pledgee's claim is satisfied; and he holds this surplus to secure the debt of the consignee to him. But the pledgee's claim, which the consignor is thus bound to recognize, would not be for a general balance of account, but only for the specific advances made upon the security of that particular bill of lading; and therefore, by paying or tendering that amount, the consignor acquires the right of retaking all the goods.—The insolvency of the buyer, however complete or however manifested, will not operate of itself as a stoppage in transitu. The goods must be actually stopped, in some way which the law recognizes as adequate, by the seller or his authorized agent. An actual taking possession by the seller is however not necessary, at least not in all cases, although actual possession should be taken if possible, and as soon as possible. Yet a constructive possession may suffice for the seller. This is usually and properly acquired by giving notice to the carrier of the title and purpose of the seller, forbidding him to deliver the goods to the buyer, and requiring him to give them up to the seller or his agent, or to hold them subject to his order. This notice should be given to the person who has actual possession of the goods. If the carrier, after sufficient notice to the contrary, actually delivers the goods to the buyer, the delivery does not defeat the seller's right. He has still a constructive possession, and the carrier is responsible to him for all the injury he may sustain. Or, if the buyer becomes insolvent, and the goods pass into the possession of his assignees, the seller may maintain an action of trover against them. What the consignor may do personally, he may do by his agent; and if the demand be made by one who acts as agent, but without authority, a subsequent adoption and ratification will have the effect of a previous authority, provided this be made before the goods are demanded by the buyer.

STORACE, Stephen, an English composer, of Italian extraction, born in London in 1763, died there, March 19, 1796. He received his musical education at the Conservatorio San Onofrio, Naples, and subsequently visited with his sister Anna, an accomplished singer, some of the chief cities of Europe. Returning to England in 1787, he was soon after appointed composer to Drury Lane, in which capacity he produced the "Haunted Tower," "No Song, no Supper," "The Pirates," "The Iron Chest," all successfully performed on the stage, and a number of miscellaneous pieces.

STORAX. See Balsams.

STORK, a wading bird of the heron family, sub-family *ciconinæ*, and genus *ciconia* (Linn.); other allied genera are the jabiru and marabou, described under their own names. In the storks the bill is long, straight, strong, gradually tapering to a sharp tip; sides compressed; wings long and ample, the 3d and 4th quills the longest and equal; tail short and broad; tarsi long and scaled; toes short and stout, webbed to the 1st joint; hind toe elevated, partly resting on the ground. They are large birds, most abundant in warm countries, and performing periodical migrations to and from the marshy regions of Europe, Asia, and Africa; like vultures and other carrion feeders, they eat almost any kind of garbage that comes in their way, and are hence valuable scavengers in hot climates; they seek their food on the borders of streams; the body is light and well balanced; during flight the head is thrown back and the legs extended; the space round the orbits is destitute of feathers, and in some the whole face and throat are naked. There are about a dozen species, of which the best known is the white stork (*C. alba*, Briss.); it is 3½ feet long, the bill 7¾ inches; the general color is white, with the quills and wing coverts black, and bill and feet red; around the eyes a bald blackish circle; it is the *cigogne* of the French. They arrive in N. Europe, especially in Holland and Germany, in the spring, returning in the autumn to Africa by night and in large flocks; the only noise they make is by clapping the mandibles together like a pair of castanets; they rest sleeping on one leg, with the neck folded and head turned backward on the shoulder. The food consists of reptiles, fish, young birds, and insects. The flesh was once considered a dainty dish, but is not now eaten; many famous medical preparations were in old times made from these birds. The nest is large, coarsely made of sticks and twigs, placed on housetops (often in the midst of crowded cities), and is repaired by the males year after year; the eggs are 3 or 4, white tinged with buff, 2⅝ by 2 inches; both sexes incubate, and the young are hatched in about a month; the nestlings are tenderly cared for, and are fed by food regurgitated from the parents' stomachs. The flight is very high, and the gait slow, with long and measured steps; the disposition is gentle, the manner familiar, and the docility considerable; they do not propagate in captivity, and have rather a melancholy look. According to the ancient mythology, Antigone, the sister of Priam, was changed into a stork by Juno for having boasted of her superior beauty; but the jealous goddess left her with all her virtues and amiable qualities; the stork, accordingly, has been considered by the ancients as the personification of piety, conjugal and filial love, gratitude, and temperance; it was supposed to bear a charmed life, and it was a crime to offer it violence; in some places it was even an object of worship, and in hieroglyphic language is the symbol of piety and beneficence; "pious" or "beneficent" is also the meaning of its name in Hebrew (*'hasidah*). In Holland it is always welcome as a harbinger of spring, and a house honored by a stork's nest is regarded with special favor; it is of great benefit to man in destroying serpents, frogs, lizards, mice, and other noxious animals; the attachment to its young and to its parents is proverbial. The black stork (*C. nigra*, Bechst.) is about 2¾ feet long, with a bill of 5½ inches; the color above is black with green and purplish gloss, and white below; it avoids the vicinity of man, nests in trees, and feeds like the herons chiefly on fish; it is found in many countries of Europe, especially in the Alps. The American stork (*C. Americana*, Briss.) is about as large as the white species; it is found in South America, particularly in Brazil.

STORM BIRD. See PETREL.

STORR, GOTTLOB CHRISTIAN, a German theologian, born in Stuttgart in 1746, died there in 1805. He was appointed professor of theology at Tübingen in 1775, in the same year superintendent, and in 1795 court preacher at Stuttgart. He was a chief representative of orthodox Lutheranism. He was the author of treatises on the Syriac translations of the New Testament and on the Arabic Gospels, a commentary on the Epistle to the Hebrews, and other works. His "Biblical Theology," written in conjunction with Flatt, was translated by Prof. S. Schmucker (8vo., New York, 1838).

STORRS, RICHARD SALTER, jr., D.D., an American clergyman, born at Braintree, Mass., Aug. 21, 1821. He was graduated at Amherst college in 1839, and completed his studies at Andover theological seminary in 1845. In the latter year he was ordained pastor of the Harvard Congregational church, Brookline, Mass., but a year later became pastor of the church of the Pilgrims, Brooklyn, N. Y., which position he still retains; and he has been associate editor of the "Independent" newspaper since its commencement in 1848. He has published 12 or 14 sermons, orations, and addresses; a very elaborate report on the revision of the English version of the Bible undertaken by the American Bible society some years since; a volume of "Graham Lectures, on the Wisdom, Power, and Goodness of God, as manifested in the Constitution of the Human Soul" (New York, 1856); and some minor works.

STORTHING. See NORWAY, vol. xii. p. 411.

STORY, a central co. of Iowa, intersected by Skunk river; area, 550 sq. m.; pop. in 1860, 4,052. The surface is undulating and the soil fertile. It is on the line of the projected Iowa central railroad. Capital, Nevada.

STORY, JOSEPH, an American jurist and judge, born in Marblehead, Mass., Sept. 18, 1779, died in Cambridge, Sept. 10, 1845. His father, Dr. Elisha Story, was an ardent whig of the revolution, who in 1770 removed from Boston to Marblehead. The son was graduated at Harvard college in 1798. At the university he was distinguished for his devotion to general literature and poetry, and cultivated a more than ordinary talent for versification. On leaving college, he returned to Marblehead, and began the study of law in the office of Samuel Sewall, afterward chief justice of the supreme judicial court of Massachusetts. In Jan. 1801, he removed to Salem, and finished his legal studies with Samuel Putnam, who subsequently became an associate justice of the same court. In July, 1801, he was admitted to the bar and commenced practice in Salem. His political opinions and connections were with the republican party, then in a small minority in the county of Essex; and the social differences caused by political feeling seemed likely for a time to impede his success. But his industry, learning, and fidelity, as well as his engaging manners, not only won him clients and gave him a lucrative and honorable practice, but also, notwithstanding the heats of party, secured for him the warm friendship of some of the leading federalists, and especially of the Hon. William Prescott, then at the head of the Essex bar. At this period (1804) he published a volume of poems containing "The Power of Solitude" and some smaller pieces; but it was not successful. He then, to use his own words, "took a lawyer's farewell of the muse, and, following out the precepts of Blackstone, plunged at once into the dark labyrinth of the ancient learning of the law." He became, in short, at this time a great student, notwithstanding the cares of a large practice; pushing his researches into the whole black-letter learning of the common law, as well as into the more modern systems of commercial and maritime law, and laying the broad and deep foundations of that extensive knowledge of jurisprudence for which he became afterward so much distinguished, and in which he was surpassed by no American, if by any, jurist of his own time. In 1805 he was elected to the lower house of the legislature of Massachusetts, of which he remained a member until the autumn of 1808. He took a very active part in the business of the house, as the principal leader on the republican side; but in two of the measures which he espoused, he acted upon purely independent grounds. The first was a bill to increase, and to establish on a permanent basis, the salaries of the justices of the supreme judicial court. The state constitution of 1780 had provided "that permanent and honorable salaries shall be established by law for the justices of the supreme judicial court; and that if it shall be found that any of the salaries aforesaid, so established, are insufficient, they shall from time to time be enlarged, as the general court shall judge proper." Down to the year 1807, however, the regular salaries fixed by law had continued to be entirely inadequate, and they were occasionally eked out by special grants, made generally upon the petition of the judges. In 1806 Theophilus Parsons was appointed chief justice; but he made it a condition of his acceptance that the salaries should be placed upon a constitutional footing, and this condition he communicated to Mr. Story, who undertook to carry a bill through the legislature for this purpose. His report on the subject treated the practice of low salaries and legislative grants, which had until that time prevailed, as an insufficient compliance with the constitution of the state, and strongly condemned it as unjust and impolitic. By his zealous exertions, a bill was passed (1807), by which the salaries were raised and permanently established. The other measure introduced and advocated by Mr. Story, in disregard of party lines, was a bill (1808) to establish a court of chancery for the state; but he was not successful. In the same year he defended the embargo as the only measure which the administration of Mr. Jefferson could have adopted, short of a declaration of war, without submitting to the ignominious restrictions on American commerce by the belligerent powers. He had previously (1806) written the celebrated "Memorial of the Inhabitants of Salem relative to the Infringements on the Neutral Trade of the United States," addressed to the president and to congress. In the autumn of 1808 he was elected to congress from the Essex district. In opposition to the wishes of the administration he exerted himself to procure a repeal of the embargo. This defection from his party was warmly resented by Mr. Jefferson. But Mr. Story separated himself from the administration on the question of continuing the embargo, upon the ground that he had originally supported it as a temporary measure; that as such it had done all the good of which it was capable; that it was then doing uncompensated mischief; and that its continuance as a permanent law would endanger the authority of the government and the perpetuity of the Union. He left congress before the repeal was consummated, but not before he had largely contributed to bring it about; and indeed Mr. Jefferson attributed it almost wholly to his exertions. While there, he endeavored to effect an increase of the navy, but without success. Declining a reëlection to congress, he was again chosen to a seat in the legislature of Massachusetts in 1810, and in Jan. 1811, he was elected speaker of the house. His character as a presiding officer is thus sketched by one of his contemporaries: "He was a most efficient and business-despatching presiding officer, and with such tact and rapidity did he manage the business of that crowded and sometimes stormy house, that it seemed often to be left with him to do with it pretty much as he pleased; and the question in controversy was often got through with, and was satisfactorily disposed of, before a large portion of the greener members knew exactly what it was, or in what stage of consideration it stood." On Nov. 18, 1811, he received from President Madison the appointment of associate justice of the supreme court of the United States, in place of Mr. Justice Cushing, then recently deceased; and on Jan. 17, 1812, he resigned the office of speaker. He now commenced that long judicial career, extending through a period of 34 years, for which he was eminently qualified by natural gifts and acquired tastes, and in which he not only won great fame as a judge, but achieved both a European and an American reputation as a comprehensive and philosophical jurist, before he began the publication of the works which he produced in the discharge of his duties in the law school at Cambridge. In 1820 the people of Massachusetts instituted a convention for the revision of their state constitution. Of this body, comprehending many of the most eminent citizens of the state, in all the walks of life, Judge Story was a very important member. His principal services in the convention related to the tenure and the compensation of the judiciary, the apportionment of the house of representatives, and the property basis of the senate. The original constitution contained, as we have seen, a clause authorizing the legislature to increase the salaries of the judges of the supreme judicial court. A motion was made and suddenly carried in the convention, to insert the words "or diminish." The reconsideration and rejection of this amendment were produced by a powerful and brilliant argument by Judge Story, which commanded the assent of more than two thirds of the convention. In committee, he advocated the district system, and the apportionment of representatives according to population, so as to reduce the number of the members; but this plan, although resorted to nearly 40 years afterward, was not then adopted. The senate had been since 1780 founded upon property, by a provision which assigned the members in the proportion of the public taxes paid by the districts which they represented. A great effort was made in the convention to overthrow this provision; but it was successfully defended by Judge Story and other leading persons, and it was not until 1840 that it was abolished, and a system of representation in the senate based purely upon population adopted. In 1829 Judge Story was appointed professor of law in Harvard university, on a foundation established by the Hon. Nathan Dane, for the delivery of lectures on the five branches of law and equity in force throughout the United States, namely, the law of nature, the law of nations, commercial and maritime law, federal law, and federal equity. For the better discharge of the duties of this professorship, he removed to Cambridge in Sept. 1829, and continued to reside there until his death. As the founder of the Dane professorship had foreseen, when he requested the appointment of Judge Story, the law school of which the latter now became the head immediately attracted students from all parts of the United States, and has continued to preserve the rank won for it by his labors, assisted by those of his colleagues, Professors Ashmun and

Greenleaf. From the time of his accession to the bench until his death, his learning, activity, zeal, and industry continually impressed themselves upon society in various functions, official and voluntary, in all of which he exercised a wide influence upon the time in which he lived. This long period comprehends his judicial life, his career as a professor and a juridical author, his services as a member of the corporation of Harvard college, and the many important but less conspicuous capacities in which he promoted the welfare, the literary culture, and the social improvement of his age and country. As a judge, he was eminently distinguished for the rapidity and ease with which he brought the copious stores of his learning to bear upon the subjects litigated before him, in tribunals embracing a wide range of jurisprudence; and if sometimes, from uncommon ardor of mind, combined with extensive knowledge, he announced conclusions apparently too soon, they were rarely such as more deliberate examination required him to modify, nor if they were did he lack the power to change them when they had been reviewed. In his constitutional views he was of the school of Washington and Marshall, upholding what he considered as the just powers of the federal Union, without encroaching upon the separate rights of the states. The long series of his juridical works, which have largely tended to widen and perpetuate his influence as a jurist, are marked by an extraordinary affluence of learning, luminous expositions, and profound views of the science of law. Few lawyers in any country have written so much, and no one has written more practically; for although primarily designed as text books for students in the law, there is not one of his treatises that does not occupy an important place in the library of the practitioner, wherever the system of jurisprudence which it touches is known and administered. They comprehend a full commentary on the constitution of the United States; an elaborate and exhaustive work on the "Conflict of Laws;" treatises on the law of bailments, agency, partnership, bills of exchange, and promissory notes; and commentaries on equity jurisprudence and equity pleadings. The materials, where the subjects admitted of such an excursive treatment, are drawn, not merely from the common law of England or America, but also in a large degree from the civil law, as practised by the Romans or by the modern nations of continental Europe. All of these works have passed through many editions. Judge Story was gifted with great colloquial powers, and his social qualities in private life largely added to the influence of his learning, talents, and public positions. A life of him by his son, William W. Story, was published at Boston in 1851 (2 vols. 8vo.). There is also a collection of his "Miscellaneous Writings" (8vo., 1854). His decisions as a circuit court judge are contained in 13 vols. 8vo., being the reports of Gallison, Mason, Sumner, and Story. His judgments pronounced in the supreme court of the United States may be found in the reports of Cranch, Wheaton, Peters, and Howard, from 1811 to 1845.—William Wetmore, an American lawyer and sculptor, son of the preceding, born in Salem, Feb. 12, 1819. He was graduated at Harvard college in 1838, studied law, and was admitted to the bar in Boston. In 1844 he published a "Treatise on the Law of Contracts," which was well received by the profession, and has passed through several editions; and in 1847 a "Treatise on the Law of Sales of Personal Property," which has reached a 3d edition. He also published 3 volumes of "Reports of Cases argued and determined in the Circuit Court of the United States for the First Circuit" (1847). Mr. Story's tastes were however more for literature and art than for the practice of the law. In 1847 he published a small volume of poems; in 1851 an elaborate and interesting life of his father (2 vols. 8vo.); and in 1856 a second volume of poems, which in originality of thought and grace of expression were decidedly in advance of his first. Mr. Story is now (Jan. 1862) and for many years has been a resident of Rome, devoting himself to the art of sculpture, for which he early showed a strong inclination. Among his works are a sitting statue of his father, in marble, in the chapel at Mt. Auburn; a shepherd boy, a statuette of Beethoven, several busts, and a model for a statue of Cleopatra which has been highly commended by all who have seen it.

STOTHARD, Thomas, an English painter, born in London, Aug. 19, 1755, died there, April 17, 1834. His talent for drawing developed itself when he was 5 years of age, and at 14 he was apprenticed to a designer of patterns for brocaded silks. Soon after his 20th year he became a designer for illustrated books, and studied painting at the royal academy, of which institution he was in 1794 elected an academician, and in 1812 succeeded Mr. Birch as librarian. As a designer he is known by his contributions to "Boydell's Shakespeare," his "Canterbury Pilgrims," the "Flitch of Bacon," and the Wellington shield, and particularly by his illustrations of Rogers's "Poems" and "Italy." During the period when annuals were in fashion his pencil was often employed in illustrations for them. The number of his designs is estimated at 5,000, of which 3,000 have been engraved. His life, accompanied by numerous illustrations from his works, including the design for Chantrey's "Sleeping Children" in Lichfield cathedral, has been written by Mrs. Bray, the widow of his son Charles Alfred (4to., 1851).—Charles Alfred, son of the preceding, born in London, July 5, 1786, died at Beer Ferrers, Devonshire, May 27, 1821. He studied painting at the royal academy, and in 1811 he published the first number of a work on the "Monumental Effigies of Great Britain," designed as an aid both to the historical painter and the player, which obtained great success. Having been appointed in 1815 historical draughtsman to the society of antiquaries, he executed for them during the next 4 years a complete series of drawings from the Bayeux tapestries, and contributed to the 19th volume of the "Archæologia" a paper showing the tapestries to be a work coeval with the Norman conquest of England. Throughout his life he was indefatigable in his efforts to perpetuate by means of drawings the relics of mediæval art in England. While engaged in tracing a portrait from one of the windows in the church at Beer Ferrers, he fell from a height of 10 feet and was killed on the spot. His work on monumental effigies was completed by his widow, now Mrs. Bray, who also wrote a memoir of him.

STOVE (Ang. Sax. *stofa*), an enclosed fireplace, used for warming rooms, cooking, &c.; also an open fireplace when this is movable. The term was also formerly applied to the room itself, heated by a fire. Some of the early methods of heating rooms are described in the article CHIMNEY. Stoves are of comparatively modern invention, and were probably first in use in the countries of the north of Europe, built of bricks and tiles of massive forms, and somewhat resembling large ovens. Dr. Franklin, who was one of the earliest writers on the subject of stoves, and himself invented some very ingenious forms of them, observes that "the Swedes, Danes, and Russians are said to live in rooms, compared to ours, as hot as ovens;" and again, that "though those countries have been well inhabited for many ages, wood is still their fuel, and yet at no very great price, which could not have been if they had not universally used stoves, but consumed it, as we do, in great quantities by open fires." The arrangements for warming apartments were exceedingly defective at the time of Dr. Franklin's inventions, which were first made in 1745. Cardinal Polignac had published in 1709, under the assumed name of Gauger, a treatise entitled *La mécanique du feu, ou l'art d'en augmenter les effets, et d'en diminuer la dépense;* and of this was published in London in 1716 a translation by Dr. Desaguliers, who modified the Polignac fireplaces, which were constructed with hollow backs, hearths, and jambs of iron, so as to adapt them for burning coal as well as wood. Count Rumford afterward introduced the same principle into stoves. The Holland stoves, described by Dr. Franklin, were plain iron box stoves, with a flue proceeding from the top, and a small iron door opening into the room. He speaks of them as using little fuel, the heat being almost all saved, and as carrying off comparatively but little air through the small flue, and of the circulation thus created as being beneficial in ventilating the apartments. They attracted little favor in England, principally because the fire could not be seen; and the same prejudice has ever since operated to prevent the general use of close stoves in that country. The German stove, as described by Dr. Franklin, was also an iron box made of 5 plates put together and fastened by screws, leaving one side open. This side was set outside of the room, the stove itself projecting through the partition. While all trouble from smoke in the room is thus avoided, the advantage of ventilation through the stove flue is lost. Dr. Franklin's stove, invented in 1745, was a great step in advance of all the older forms. It was a rectangular box of cast iron plates, open in front except near the top, with a sliding shutter by which the whole might be closed entirely or in part, either for safety or for increasing the draught. The hearth projected in front, and was cast with double ledges to receive the edges of the upright plates; and also with a number of holes, viz.: one in the front part with a regulating valve for admitting air to the fire from an air flue beneath when the shutter was down; one behind the first upright plate in the back, for discharging the air brought under the hearth from without into a narrow rectangular air box that was as long as the width of the stove, and as high excepting the space for the smoke flue over its top; and lastly 8 holes near the extreme back edge for the smoke, after it had passed over the air box and descended behind it, to enter the flue leading into the base of the chimney. The air box at its sides was furnished with holes through which the heated air was admitted into the room, and a succession of shelves one above another was provided in this box, reaching not quite across, by which the circulation of the air was extended and it was longer exposed to the heated surfaces before passing out into the room. The back plate of the stove, heated by the descending smoke flue, imparted heat to the air between it and the chimney, the stove standing a little out from the wall. A register of sheet iron was introduced in the descending flue, which could be closed wholly or in part, and check the fire to any desired extent. Thus this stove embodied the principles of the modern air-tight stoves, and the directions Dr. Franklin gave for using it are just as applicable to these, though, by reason of its ruder workmanship, the joints were not air-tight, which the inventor himself remarked, and supposed could not well be otherwise. This stove was ornamented in front with a representation of the sun, near which were the letters, intended for the name of the stove, *Alter Idem.* In 1771 Dr. Franklin completed and used in London a stove designed for burning bituminous coal and consuming its own smoke. It was a vase-shaped iron vessel for receiving the fuel, set upon a horizontal grate, and beneath this was a large box of cast iron, furnished with partitions, which caused the flame and smoke drawn down through the grate to circulate around until they finally escaped into the chimney by a flue at the bottom on each side. With the same object of consuming the smoke, he also invented a basket grate or cage, with movable bars at the top and bottom. The fuel being introduced at the top and kindled, the cage might then be turned over upon pivots, which supported it by the centre. The name of Count Rumford afterward became celebrated for the improvements which he introduced in stoves, especially those designed for culinary purposes. He greatly reduced their dimensions, and contrived that most important feature in all cooking stoves, of arranging a number of pots and boilers over the flues proceeding from a single fire; and the method of roasting meats in ovens of sheet iron stoves without their acquiring a disagreeable taste, a gentle current of air being allowed to circulate through the ovens.—The stoves of the north of Europe, already referred to as massive structures, are variously built of brickwork and pottery, and sometimes faced with porcelain. They stand upon a platform raised a little above the floor, with a fireplace in the bottom, and at intervals of a few inches horizontal partitions or floors extending nearly across the interior, the openings alternating with each one from one side to the other of the stove. The most elaborate of them are tower-like structures of pure white porcelain, rising one story above another, and finished with various architectural ornaments; sometimes surmounted with classic figures of great beauty, and furnished with brass doors that are kept as bright as gold. The walls are made very thick with brick, and the tiles that form the outside are backed with a sort of earthenware box filled with mortar, and stuck upon the brickwork by iron hooks or pins set in the joints for this purpose. The object of this is to present a heavy mass for receiving and gradually giving out the heat. After the fire has been well kindled, the aperture below for the admission of air is closed, and the door above the fire is opened. This is to check too rapid combustion; and when the fire is at the hottest this door is closed, and also the aperture into the chimney. Thus regulated, these great stoves are commonly kept sufficiently hot during 24 hours by a single feeding of the fire. Some of them are constructed with ovens and with receptacles for boiling. The fireplace is sometimes on the back of the stove, opening into an adjoining apartment. Owing to the material, and moderate heat of the outside, the air is not unpleasantly affected by the burning of any floating particles. Where these stoves are used, all access of air into the room is carefully prevented by tight doors and double windows, and the closing of all crevices. In Germany cast iron stoves are used to some extent, which are provided with tortuous smoke flues, sometimes rising above the stove on each side, and meeting in an arch form before connecting with the chimney flue.—Stoves in the United States are used of the greatest diversity of forms, of cast iron, of sheet iron, and sometimes of soapstone; and those of iron are commonly lined with fire brick specially adapted to their shapes, which not only increases the durability of the stoves, but prevents the iron from being overheated and disagreeably affecting the atmosphere. The stoves are not merely designed for warming apartments, but are also made for cooking purposes, either with wood or anthracite for fuel. When made of brickwork and iron plates and permanently set, the apparatus is called a cooking range. The manufacture of stoves is a very important branch of industry, and is carried on upon an immense scale in many places. In Albany, N. Y., as stated in the article FOUNDERY, nearly 200,000 stoves are annually produced. A large proportion of these are cooking stoves of a great variety of patterns, made of the best mixtures of cast iron, in thin plates, the corresponding parts in all stoves of the same pattern being exact duplicates. These stoves are provided with boilers, kettles, and all necessary cooking utensils. Air-tight stoves were introduced not many years since, and have been very generally used for warming rooms, in the country especially, notwithstanding the charge brought against them of vitiating the air by reason of their obstructed draught. They have also in a few instances been the cause of explosions through sudden admission of air to the gases generated by the combustion and pent up in the tight receptacle. Stoves heated by jets of burning gas have recently come into use for warming rooms, and also for cooking. (See GAS, vol. viii. p. 101.)

STOW, BARON, D.D., an American clergyman, born in Croydon, Sullivan co., N. H., June 16, 1801. He was graduated at Columbian college, D. C., in 1825, and for the next two years was editor of the "Columbian Star," a religious newspaper published in Washington. On Oct. 24, 1827, he was ordained pastor of a Baptist church in Portsmouth, N. H., and in 1832 became pastor of the Baldwin place Baptist church in Boston, and afterward of the Rowe street church. He was recording secretary of the board of the general missionary convention, afterward merged in the American Baptist missionary union, from 1838 to 1846; he has served 27 years on its executive committee, and in 1835, 1841, and 1858 was elected its corresponding secretary, but in each case declined from a preference for the pastoral work. Dr. Stow is president of the trustees of the Newton theological institution, and a member of the board of fellows of Brown university and of the board of overseers of Harvard university. In 1840-'41 he made the tour of Europe, and in 1859 he spent some time in Great Britain. His published works, apart from occasional sermons, numerous articles in reviews and periodicals, introductions to books by other authors, &c., are: "Daily Manna for Christian Pilgrims" (Boston, 1848); "Christian Brotherhood;" "The Psalmist," by Dr. Stow and the Rev. S. F. Smith (1849); "First Things, or Development of Church Life" (1859); "The Whole Family in Heaven and Earth" (1860); "History of the Danish Mission on the Coast of Coromandel;" "Memoir of Harriet Dow;" "Question Book of Christian Doctrine" (1848); and "History of the English Baptist Mission to India" (Philadelphia).

STOW, John, an English antiquary and annalist, born in London in 1525, died in 1605. He was bred a tailor, and in 1560 devoted himself to the study of the antiquities of English history, but was occasionally obliged to return to his trade to obtain a subsistence, until he was assisted by Dr. Parker, archbishop of Canterbury. Stow made an extensive collection of papers, and, as many of them were Catholic records, they were thought suspicious, and he was cited before an ecclesiastical commission on charges preferred by his own brother; but upon trial he was acquitted of any dangerous attempt. In his old age he was in want, and in 1603 received from James I. a brief by which he was authorized to collect in churches the benefactions of the well disposed. His works are: a "Summary of the Chronicles of England" (8vo., 1561); the "Survey of London" (4to., 1598); and "Flores Historiarum; or Annals of this Kingdom, from the Time of the Ancient Britons to his Own." The folio volume entitled "Stow's Chronicle" was published after his death. The "Summary" concludes with 1560, and the "Flores Historiarum" is only an extensive amplification of the same work; and even this formed but part of a projected "far longer work" for which Stow had accumulated materials.

STOWE, Calvin Ellis, D.D., an American clergyman, born at Natick, Mass., April 6, 1802. He was graduated at Bowdoin college in 1824, and, after a year's service as tutor and librarian, entered Andover theological seminary in 1825, and spent two years after completing his studies there in assisting Prof. Stuart, acting at the same time as assistant editor of the "Boston Recorder." In 1830 he was inaugurated as professor of languages in Dartmouth college, and in 1833 became professor of biblical literature in Lane seminary, Cincinnati. Here, in addition to his regular duties, he aided in laying the foundations of the present public school system of Ohio, lecturing and writing on the subject with great effect. In May, 1836, he visited Europe to procure a library for Lane seminary, and to examine, in behalf of the state of Ohio, the public school system of Prussia and some of the other German states. On his return, the next year, he published his report on "Elementary Education in Europe," which was distributed in every district of Ohio by the legislature of that state, and republished and circulated in 6 or 7 other states. He subsequently published reports on the "Education of Immigrants," on "The Course of Instruction in the Primary Schools of Prussia," and on "Elementary Instruction in Prussia." In 1850 he accepted an appointment as divinity professor at Bowdoin college, and in 1852 as professor of sacred literature in Andover theological seminary, which latter he still holds.—Harriet Elizabeth Beecher, an American authoress, wife of the preceding, and daughter of the Rev. Lyman Beecher, D.D., born in Litchfield, Conn., June 15, 1812. At the age of 15 she was associated with her sister Catharine as principal of a female seminary at Hartford, and in 1833 accompanied her father, who had been elected president of Lane theological seminary, to Cincinnati. She was married in 1836, and removed from Cincinnati with her husband in 1850. She had previously written frequently for periodicals, and published a small volume of sketches entitled "The Mayflower," and several Sunday school books. In 1851–'2 her novel of "Uncle Tom's Cabin" was furnished in weekly chapters to the "National Era," an anti-slavery newspaper of Washington, D. C. On its completion it was published in 2 vols. 12mo. (Boston, 1852), and met with extraordinary success; no work of fiction in the English language ever had a circulation at all comparable to it. In the United States 4 different editions were published, one illustrated and one in German, and not far from 400,000 copies were sold. In England, not being protected by copyright, editions were issued at all prices from 6*d.* to 10*s.*, and more than 500,000 copies were sold. It was translated into every language of Europe, and several of those of Asia, including Arabic and Armenian; and in many of these, as in the German, French, Italian, Welsh, Wallachian, and Russian, there were from 2 to 12 different translations. It was dramatized in a great number of versions, and acted at almost every theatre in Europe and America. The British museum has a long shelf filled with its different translations, editions, and versions. The truth of some of her statements respecting slavery having been called in question, she published in 1853 a "Key to Uncle Tom's Cabin," verifying them by official and other authentic documents. In 1853 Mrs. Stowe visited Europe, and was warmly welcomed. Several of the English publishers of "Uncle Tom" offered her a copyright compensation, and she received numerous testimonials from the readers of that work. On her return she published "Sunny Memories of Foreign Lands" (2 vols. 12mo., Boston, 1854) and a new and enlarged edition of her "Mayflower." After a second European tour she published "Dred, a Tale of the Dismal Swamp" (1856). "The Minister's Wooing" (12mo., Boston, 1859), a fiction portraying New England life in the latter part of the 18th century, originally appeared serially in the "Atlantic Monthly" magazine (Boston); and another from her pen entitled "Agnes of Sorrento" is now (1862) in course of publication in the same work, beside one entitled "The Pearl of Orr's Island" in the "Independent" newspaper (New York), to which she has been a contributor since 1848.

STOWELL, William Scott, baron, an English jurist, born in Heworth, Durham, whither his family had fled before the advancing army of the young pretender, Oct. 17, 1745, died Jan. 28, 1836. He was the eldest son of William Scott, a coal merchant at Newcastle-upon-Tyne, and with his brother John, afterward earl of Eldon, received his early education at the Newcastle grammar school. Having, through the accident of his birth in Heworth, obtained a Durham scholarship at Corpus Christi college, Oxford, he took his bachelor's degree there in 1764, was elected a fellow of University college, and soon after a college tutor. In 1774 he became Camden professor of ancient history in the university, in which capacity he delivered a course of lectures which greatly enhanced his previously high reputation for scholarship. He was in the latter part of 1779 admitted at doctors' commons into the faculty of advocates, and in Feb. 1780, was called to the bar. He readily adapted himself to the practice of the ecclesiastical courts, while an early association at Newcastle with shipping interests suggested the admiralty courts as a field of labor. He accordingly made a speciality of these branches of his profession, and in a few years had obtained so great a reputation as to complain of being "exceedingly oppressed with business." Within a few years he was appointed successively registrar of the court of faculties, judge of the consistory court, vicar-general of the archbishop of Canterbury, and advocate-general. In 1798 he was made judge of the high court of admiralty, the highest honor attainable in his profession, outside of the courts of law and equity. This office he occupied for nearly 30 years, with a reputation surpassing that of any other incumbent, and his decisions are unhesitatingly accepted as law. He entered public life in 1784 as member of parliament for Downton, but was unseated on petition. He subsequently, however, represented this borough for several years, and in 1801 was elected one of the members for the university of Oxford, which constituency he represented until 1821, when he was created Baron Stowell of Stowell Park. He was, like his brother Lord Eldon, strongly conservative, but took no active part in politics. In private society he was noted for his brilliant conversational powers, his wit and polished manners; and, in the latter part of his life, for his gluttony and excessive avarice. It is said that his refusal to allow his only son a sufficient sum to marry drove the latter to intemperance. He died two months before his father, whose title expired with him, and whose immense wealth was divided among collateral relations. Lord Stowell's judgments in the admiralty court, reported by Dr. Dodson, were revised by himself, and, in the words of Lord Brougham, "should form part of every classical library of English eloquence or even of national history."

STRABO, a Greek geographer, born at Amasia, in Pontus, Asia Minor, about 54 B. C., died about A. D. 24. He studied rhetoric under Aristodemus at Nysa; was a pupil at Amisus in Pontus of Tyrannio the grammarian, and at Seleucia in Cilicia of Xenarchus, a peripatetic philosopher. At Alexandria in Egypt he studied under Boëthus of Sidon, also a peripatetic; and at Tarsus under Athenodorus, a stoic. He travelled in Syria, Palestine, Egypt, Crete, northern Greece, a part of Peloponnesus, and Italy, and it is probable that he spent a considerable time at Rome. He wrote some "Historical Memoirs" (Ὑπομνηματα ἱστορικα), which are lost, and his "Geography." This work is divided into 17 books; the first 2 treat of cosmography, or the description of the earth in general, and the other 15 give accounts of particular countries, 8 of them treating of Europe, 6 of Asia, and 1 of Africa. The origin of peoples, their migrations, the foundation of cities, and establishment of empires, are considered fully, and often very minutely. For his descriptions of places Strabo relied mostly upon his own observations, and speaks only in a general manner of those places which he had not himself seen. His accuracy in many of his statements is doubted, yet his work is one of the most valuable that have come down from antiquity. Among the best editions of Strabo are those of Casaubon (1597) and Kramer (1844–'52). There is an English translation by Falconer and Hamilton (3 vols., 1854–'7).

STRADA, FAMIANO, an Italian author, born in Rome in 1572, died there in 1649. He entered the order of Jesuits, became professor of rhetoric in the Gregorian college at Rome, and there spent the greater part of his life. He wrote *Prolusiones Academicæ*, a series of essays upon rhetoric and literature; but his most important work is the history of the Spanish war in the Netherlands, entitled *De Bello Belgico ab Excessu Caroli V. ad Annum* 1590 (fol., Rome, 1640–'47), translated by Sir R. Stapylton (fol., London, 1650).

STRADELLA, ALESSANDRO, an Italian musician and composer, born in Naples about 1645, assassinated in Genoa in 1678. He was regarded as the first musician of his time, and it is related that his skill was such that a jealous rival of his in an affair of gallantry was disarmed and became his friend on hearing him sing in his oratorio *Di S. Giovanni Battista*. This was in 1676. Two years later, however, he perished.

STRAFFORD, THOMAS WENTWORTH, earl of, an English statesman, born in London in 1593, executed on Tower hill, May 12, 1641. He was educated at St. John's college, Cambridge, travelled abroad, became at the age of 21, upon the death of his father, the possessor of very considerable family estates, and in 1614 was elected to parliament for the county of York. His prepossessions on the side of popular rights, and his eloquence in opposition to the king, marked him as a leader of the commons to be dreaded, and if possible to be silenced, by the court party. It is a memorable coincidence that Hampden and Wentworth attained to political prominence at the same time. Both were among the richest and most powerful commoners of England, and both were equally distinguished by force of character and talent. "Hampden," says Lord Macaulay, "had more judgment and sagacity than Wentworth; but no orator of the period equalled Wentworth in force and brilliancy of expression." In 1626 both were committed to prison by the king, for refusing to pay taxes illegally levied. Here their paths separated. The king saw the necessity of corrupting, if possible, the chiefs of his enemies. Hampden had already turned away with contempt from aristocratic honors, the acceptance of which at that mercenary period he felt would be degrading. Sir Thomas Wentworth, however, yielded to the seduction, and is branded in history as the first Englishman to whom a peerage was not an addition of honor. He was the first and the greatest upon the list which soon grew rapidly. As late as 1628 Wentworth was still an unshaken opponent of the court, and had become one of the most conspicuous advocates of the "Petition of Right." High terms were offered to him. He was first gained over by the offer of a peerage. He was first created Baron, and soon after Viscount Wentworth. He abandoned his old associates, and ever after hated them with the hatred of a renegade. "Whipped," he said, should Hampden be. "I would have him whipped into his right senses; and if the rod be so used that it smart not, I should be the more sorry." Pym, who foresaw in Wentworth an English Richelieu, uttered his ominous threat: "You have left us, but while your head is on your shoulders I shall not leave you." The viscount was soon elevated to higher title and to great office. He became earl of Strafford, lord lieutenant of Ireland, and president of the council of the north; and although, after the assassination of the duke of Buckingham, Charles appears to have been his own prime minister, Strafford was his chief councillor. The earl perfectly understood the feelings, resources, and policy of the men whom he had deserted, and was able to lay his schemes with a depth which came near confounding the tactics of the skilful leaders of the parliament. His object was to make his master an absolute monarch; and it was his boast that in Ireland, of which he was the viceroy, he succeeded. The king was "as absolute" in that island, to use his own words, "as any prince in the whole world." The skill and the daring energy of Strafford have commanded the wonder of all historians; and had his object been for the good of his country and of his kind, history might record his name with unqualified admiration. But there is scarcely a virtue, in the strict sense of the term, to redeem the character of this "great, brave, bad man." Government by the sword was his favorite scheme. In Ireland his executive administration set at naught the courts of law. No man left the island without his permission; vast monopolies were established for the benefit of his partisans; taxes were laid at his will, and levied by military force; and men who chanced to offend the powerful earl were condemned by his minions to death. Arbitrary and tyrannical however as Strafford was, it is universally conceded that he greatly improved the general condition of the people of Ireland. His viceroyalty was several times interrupted by the calls of the king to his counsels, when trouble sorely beset him. Charles put him in command of the army against the insurgent Scots, before whom the royal troops fled panic-struck, after the rout at Newburn (Aug. 28, 1640); and Strafford, possessing more vigor of mind than the king or any of the council, advised strenuously against accepting the terms which the insurgents would impose. But Charles, in despair of being able to stem the torrent, determined to yield to it. The king saw himself moreover compelled to summon a parliament, and Strafford, dreading the consequences, besought his master to allow him to return to Ireland. Charles, however, desirous of profiting in the emergency by his great talents, and pledging his royal word that "not a hair of his head should be touched by parliament," prevailed upon the unhappy minister to brave the issue. The assembly met on Nov. 3, 1640. On the 18th Pym, true to his word, appeared on the part of the commons at the bar of the house of lords, with the message of impeachment. The earl, who had just taken his seat, was immediately sent to the tower. The articles of impeachment, at first 9 in number, were afterward increased to 28, with a view to convict the accused of an attempt to subvert the fundamental law. The impeachment of Strafford was the first retributive blow dealt upon the king. The guilt of the minister is placed beyond a doubt by evidence which has come to light since his death; but it was never proven by his accusers, and his defence was so strong, his abilities and presence of mind, his shrewdness, consistency, and eloquence, his judgment and composure so overwhelming, that the house abandoned the original impeachment, and had recourse to other means of bringing him to his end, which were wholly unjustifiable. A bill of attainder, brought into the lower house, was passed by a great majority. The lords, in a panic, complied; and the bill was sent to Charles for his approval. The king had striven to keep his word that not a hair of his servant's head should be in danger. In fearful distress, with popular violence impending in case of refusing the warrant for the execution, the unhappy monarch saw no resource, no security; and Strafford, learning the truth, wrote a letter with much appearance of magnanimity, advising and urging the irresolute king, for the sake of the public peace, to sacrifice a life which would be resigned cheerfully to a master who had bestowed such "exceeding favors." Such was the spirit of the earl's last counsel to the king. Historians, however, refuse to ascribe the proceeding to generosity or disinterestedness. He may or may not have been, as Hume suggests, actuated by the hope of what must appear to every generous mind would be the effect upon the king, viz., to resolve, after such an act, at every hazard to rescue his best friend. Charles, however, was not thus affected. He acceded; and Strafford, lifting his eyes to heaven, as if doubting his senses, gave impulsive yet gentle utterance to his emotion. "Put not your faith in princes," he said solemnly, as though the sacred volume opened now for his teaching, "nor in the sons of men; for in them there is no salvation." The king lived to be far more unhappy than the friend whom he had abandoned. The remainder of his life was haunted by strong compunction for this act; and even at his own fatal end, the memory of this guilt came upon him with poignant remorse. The earl, on the other hand, laid his head upon the block as though his career had been that of a life-long benefactor of his kind. Nothing in the history of executions has ever surpassed the manliness of his conduct from the hour of his impeachment. He moved from his prison to Tower hill with an air of dignity surpassing even his ordinary noble aspect. "I lay down my head," said he, after declaring his innocence, "as cheerfully as ever I did when going to repose." His memory remains as one of the most eminent and brilliant personages that have appeared in England; and at this remote day his features on the "living canvas" of Vandyke still awe the beholder, as the haughty earl in life overawed his contemporaries. His attainder was reversed under Charles II. His "Letters and Despatches" were edited by Dr. Knowler (2 vols. fol., London, 1739).

STRALSUND, a strongly fortified seaport town of Prussia, in Pomerania, capital of the administrative district of the same name, situated on the strait which separates the island of Rügen from the mainland, in lat. 54° 18′ N., long. 13° 6′ E., 120 m. N. from Berlin; pop. 20,333. The site of the town is so completely surrounded by water, that it can only be approached by bridges, which connect it with its 3 suburbs on the mainland. Though the town has a gloomy appearance, it is clean and well paved. The principal churches are those of St. Nicholas and St. Mary, the former dating from the 13th century, and the latter from the 14th. They are both fine specimens of the pointed style of architecture, and have many valuable paintings. The town hall contains a public library, and the gymnasium has both a museum and library. The manufactures include linen and woollen goods, starch, sugar, tobacco, soap, and leather. Ship building is carried on, and there is an active trade. The chief exports are wheat, malt, timber, wool, and linen. The harbor is large, but shoals prevent vessels drawing more than 15 feet from entering it.—Stralsund was built by Jaromar I., prince of Rügen, about the year 1209, and soon rose to be a place of importance, and became a member of the Hanseatic league. It successfully resisted Wallenstein, who besieged it in 1628, and lost 12,000 men before its walls. The Swedes gained possession of it by the peace of Westphalia, and Frederic William, elector of Brandenburg, captured it from them in 1678, but restored it in the following year. Stralsund surrendered to the Prussian, Danish, and Saxon forces in 1715, but was given back to Sweden in 1720. It was surrendered to the French in 1807, who destroyed a great part of the fortifications; and by the treaty of Kiel in 1810 it was ceded to Denmark. In 1815 Denmark surrendered it to Prussia.

STRAMONIUM. See Datura.

STRANGE, Sir Robert, an English engraver, born in Pomona, one of the Orkney isles, July 14, 1721, died July 5, 1792. While an apprentice to an engraver in Edinburgh he joined the forces of the young pretender, and after the battle of Culloden was obliged to take refuge for some time in the highlands. Having studied abroad for some years, he settled in 1751 in London, and soon rose to great repute as a historical engraver. During a second visit to the continent in 1760 he executed many admirable plates after the old masters, and was made a member of the academies of Rome, Florence, Bologna, Parma, and Paris. He amassed a fortune by his art, as well as by his shrewdness and judgment as a dealer in pictures. He wrote a "History of the Progress of Engraving," which was never published, and commenced an autobiography, given in the memoir of him by James Dennistoun of Dennistoun (2 vols. 8vo., 1855).

STRASBOURG (Ger. *Strasburg* or *Strassburg*), a town of France, capital of the department of Bas-Rhin, situated on the Ill, a tributary of the Rhine, about a mile from its junction with that river, and 250 m. E. by S. from Paris; pop. in 1862, 82,014. It stands upon level ground, is nearly 6 m. in circuit, and is defended by a wall with bastions, ditches, and outworks, and a strong citadel constructed by Vauban. It is entered by 7 gates, and the Rhine is crossed by a bridge of boats which leads to the fortress of Kehl in Baden. The Ill flows through the town in a N. E. direction, has many branches, and is crossed by several wooden bridges. The streets are generally crooked and narrow, but the principal ones are broad, and there are several fine squares. The houses are well built and rather lofty with steep roofs. The cathedral of Strasbourg is considered one of the finest Gothic buildings in Europe, and its spire is the highest in the world, being 466 feet. It was originally founded in 504, but the edifice was almost completely destroyed by lightning in 1007. The present building was begun in 1015 and completed in 1439. The W. front is richly decorated with sculptures, statues, and bass-reliefs, rises to the height of 230 feet, and has a circular window 48 feet in diameter. The principal dimensions are: extreme length 357 feet, height of ceiling 79 feet, length of transepts 140 feet, and breadth of the nave 35 feet. There are 14 other churches, the most interesting of which are those of St. Stephen, St. Thomas, the Temple Neuf, and St. Pierre le Jeune; and the Jews have a splendid synagogue. The other buildings most worthy of notice are the episcopal palace, prefect's office, town hall, custom house, court house, the public library containing 180,000 volumes, the royal academy, theatre, and picture gallery.

The military establishments are on an extensive scale, and include an arsenal, artillery school, cannon foundery, barracks, and hospital. The manufactures are numerous, and include woollen, linen, and cotton goods, sail cloth, jewelry, clocks and watches, cutlery, hardware and cast iron articles, porcelain, earthenware, soap, leather, straw goods, hosiery, paper, and cards. There are numerous bleachfields, dye works, sugar refineries, breweries, and printing offices; and the town is celebrated for its goose liver pies (*pâtés de foies gras*). The trade of Strasbourg is extensive, and is greatly facilitated by the navigation of the Rhine.—Strasbourg occupies the site of the ancient Argentoratum, which after the Roman conquest was made a frontier fortress against the Germans. It was a free city of the empire during the middle ages, and was a Protestant city till seized by Louis XIV. in 1681; but although nearly two centuries have since elapsed, it still retains in its appearance, people, and language the general characteristics of a German town. It is one of the strongest of fortresses, having been improved under the direction of Vauban.

STRATFORD DE REDCLIFFE, STRATFORD CANNING, viscount, an English diplomatist, born in London, Jan. 6, 1788. He is a cousin of George Canning, and was educated at Eton, and at King's college, Cambridge. He commenced his public career in 1807 as *précis* writer in the foreign office, and in 1808 was appointed secretary to the special mission at Constantinople under Sir Robert Adair, whom he subsequently succeeded as minister plenipotentiary. In 1814 he was despatched in the same capacity to Switzerland, and assisted in framing the treaty which united the 19 cantons in the Helvetic confederation; and in 1820 he was appointed minister at Washington, where he remained 3 years. Between 1824 and 1829 he participated at St. Petersburg and Constantinople in the negotiations which led to the recognition of the independence of Greece by England, France, and Russia. In 1831 he was again sent to Constantinople on a special mission, and in the same year he went in a similar capacity to Madrid. For several years he held no public office, though twice offered the governor-generalship of Canada by Lord Melbourne; but upon the accession of Sir Robert Peel to power in 1841 he was reappointed minister to Constantinople, where he remained until relieved by Sir Henry Bulwer in 1858. In April, 1852, he was raised to the peerage, having previously sat in the house of commons for Old Sarum, Stockbridge, and Lynn-Regis. His long residence in Constantinople, and his familiarity with eastern politics, have given him an influence with the sultan enjoyed by no previous English ambassador. Many important reforms in Turkey, particularly those affecting the condition of the Christian population, have been attributed to his efforts.

STRATFORD-UPON-AVON, a municipal borough and market town of Warwickshire, England, situated on the right side of the river Avon, 9 m. S. W. from Warwick, and 96 m. N. W. from London; pop. in 1851, 3,372. Stratford was a place of some consequence as early as the middle of the 8th century, but derives its sole interest at the present day from the fact that it was the birthplace of Shakespeare, his abode in youth and age, and the place of his death, and is the present depository of his remains. A part of the ancient house in which he is said to have been born, and of which he retained the possession at the time of his death, is still standing in Henley street, and has recently been purchased for the nation by subscription at a cost of about £4,000. The chamber of his birth and other parts of the building supposed to be associated with his history are preserved with great care, and, so far as possible, in the same condition as in the poet's lifetime. Measures have recently been taken to raise a fund for the purpose of keeping the building in repair. The church, a handsome cruciform structure with a fine tower and spire, situated near the river, contains his remains and those of his wife, which are buried in the chancel on the north side, and in the vicinity of a monument, the distinguishing feature of which is the celebrated portrait bust of Shakespeare in marble. This edifice was thoroughly restored in 1840, and is now one of the best preserved ecclesiastical buildings in the country. The grammar school, in which, according to tradition, Shakespeare was educated, is established in the upper part of the ancient guildhall; and among the places in the immediate neighborhood traditionally associated with incidents of his youth are the cottage of his wife, Anne Hathaway, in the adjoining parish of Shottery, and Charlecote house, the seat of the Lucys, a few miles higher up the Avon. In 1769 a Shakespeare "jubilee" was celebrated in Stratford under the direction of Garrick, on which occasion the present town hall, which contains a statue of Shakespeare, was erected. Recently a triennial commemorative festival was proposed, but has not been observed with any regularity. New Place, the residence in which Shakespeare passed his latter years and where he died, came about the middle of the last century into the possession of a clergyman, the Rev. Francis Gastrell, who, after having in 1756 cut down a mulberry tree venerated by the townspeople on account of the tradition that Shakespeare had planted it, destroyed the house itself in 1759. Part of the garden belonging to New Place, however, still remains, and was secured to the possession of the public in perpetuity by subscription in 1861.

STRAUSS, DAVID FRIEDRICH, a German theologian, born in Ludwigsburg, Würtemberg, Jan. 27, 1808. He was educated at Blaubeuren and Tübingen, was engaged as curate in 1830 and as professor at Maulbronn in 1831, and in 1832 became *Repetent* in the theological seminary at Tübingen, where he also lectured on the Hegelian philosophy in the university. His name was unknown when he published *Das Leben Jesu* (2 vols., Tübingen, 1835; 4th ed., 1840; translated by Marian Evans, 3 vols., London, 1846, 1 vol., New York, 1850), a work remarkable for its boldness and acuteness, which more than any other engaged the attention of Protestant theologians for many years. Its design was to establish for Christianity a mythological instead of historical basis, to resolve the Gospels into popular legends, and the miracles into significant poetry. It supposed the existence of Jesus, an exemplary and reformatory rabbi of Galilee; that he lived and died an enthusiastic and admired teacher and innovator; that after his death many marvellous incidents concerning him gradually gained currency; that some of these were exaggerations of actual events, and others symbolical forms in which his disciples clothed his doctrines and precepts; that these wonderful narratives were not designed by single persons, but were the spontaneous outgrowth of poetical and philosophical tendencies in the early church; that they circulated orally for half a century or more, being constantly magnified and multiplied; and that from this cluster of myths, this mass of legendary and poetical lore, various compilations were then made, of which there have come down to us the 4 canonical and several apocryphal Gospels. Having thus attempted to resolve the historic Christ into a myth, the second part of the work proceeds by means of the Hegelian philosophy to assign a new meaning to the New Testament. The career of Christ symbolizes the moral history of mankind. Humanity is God manifest in the flesh, sinless, working miracles, dying, rising, and ascending to heaven. Thus the narrative applies not to an individual, but to the race; the dogmas are true, though the history is false; and the early Christians unconsciously gave a concrete development to Hegelian philosophemes. Replies to this work on exegetical, historical, and philosophical grounds immediately appeared in Germany, and soon after in France, England, and America. It was controverted by the most prominent biblical and patristic scholars in those countries. The author was deprived of his position as *Repetent*, though he urged that he believed as an idea every thing which others believed as history, and became a teacher at Ludwigsburg, and after 1836 in Stuttgart. In Berlin the ministry of public worship asked the advice of Neander whether to suppress the book. He replied that it contained views which left no basis for historical Christianity, but that it was written with scientific earnestness, and ought to be met and answered only in the forum of science. In 1837 Strauss replied to his critics by 3 volumes of *Streitschriften*, and in 1838 by *Zwei friedliche Blätter*, but subsequently availed himself of the new editions of his work to controvert his opponents. In 1839 he was invited, after violent opposition, to the university of Zürich as professor of dogmatics and church history. In this position he published *Charakteristiken und Kritiken* (Leipsic, 1839), a collection of essays, and his second important work, *Die christliche Glaubenslehre in ihrer geschichtlichen Entwickelung und in ihrem Kampfe mit der modernen Wissenschaft* (2 vols., Tübingen, 1840–'41), a historico-critical treatise on Christian dogmatics. His next publication was *Der Romantiker auf dem Throne der Cäsaren* (Mannheim, 1847), a satirical parallel between the restoration of heathenism by Julian, and the restoration of Protestant orthodoxy by the king of Prussia. In 1848 he was the unsuccessful candidate of his native town for the parliament at Frankfort; and the public addresses which he delivered at this time were collected under the title, *Sechs theologisch-politische Volksreden* (Stuttgart, 1848). The same constituency however elected him nearly unanimously to the diet of Würtemberg, where he astonished all parties by ranging himself among the conservatives. He has since published a series of biographical studies: *Schubart's Leben in seinen Briefen* (1849); *Christian Märklin, ein Lebens- und Charakterbild der Gegenwart* (1851); *Leben und Schriften Nikolaus Frischlin's* (1855); and *Ulrich von Hutten* (2 vols., 1858).

STRAUSS, Gerhard Friedrich Abraham, a German divine, born at Iserlohn, Sept. 24, 1786. He was educated at Halle and Heidelberg, became a pastor at Ronsdorf in 1809 and at Elberfeld in 1814, and in 1822 was invited to Berlin as preacher to the court and as professor in the university. Among his publications are: *Glockentöne, oder Erinnerungen aus dem Leben eines jungen Predigers* (3 vols., Elberfeld, 1812–'20; 7th ed., 1840); *Helon's Wallfahrt nach Jerusalem, 109 Jahre vor der Geburt unsers Herrn* (4 vols., Elberfeld, 1820–'23); and several collections of sermons.

STRAUSS, Johann, a German composer, born in Vienna, March 14, 1804, died there, Sept. 15, 1849. At 19 years of age he entered the orchestra of Lanner, a popular composer of dance music, stimulated by whose success he attempted a similar class of compositions. He soon organized a new band, which under his direction became famous for the brilliancy and perfection with which it executed the lighter forms of music; and in like manner his waltzes and dances, remarkable for their adaptation to the purposes intended, became celebrated and popular all over Europe.

STRAW, the stem or stalk of plants of the natural order *gramineæ* or grasses, commonly understood as limited to those which produce the edible grains. It is applied to a variety of useful purposes after the grain has been removed by threshing or by clipping off the heads. It consists of a jointed tube of woody fibre, containing in its outer portion especially much silica, combined in part with potash and soda; and the same alkalies also exist in the ash, in the form of chlorides and sulphates. The return of these salts to the soil cannot fail to be beneficial to new crops, and straw is advantageously used by farmers as a fertilizer; an excellent mode of preparing it for this use is to cause it to absorb liquid manures and then expose it in compost heaps to ferment. It is largely consumed upon farms for littering animals, and is made use of as a material for beds. It is also used, by the method called thatching, as a covering of roofs of buildings, and for protecting stacks of hay from the weather. Being while dry a poor conductor of heat, it serves to protect delicate plants and trees from frost, and it is sometimes made into ropes for particular modes of applying it to this use. In the West Indies it is the common material of the large pack saddles; and in the United States and in Europe it is frequently employed for the collars of draught horses. It is largely used for matting for floors, and in the East Indies is even woven into sails for vessels. In the arts, the principal uses of straw are for the manufacture of hats and bonnets, and to some extent of paper and of ornamental baskets. The Japanese cover boxes of various kinds with split straws, laying them close together so as to present a smooth flat surface, of delicate satin lustre.—The plaiting of straws for hats and bonnets is of comparatively modern invention, not being traced back beyond the commencement of the 17th century, when, as narrated in Coryat's "Crudities," "delicate strawen hats" were worn by men and women in many places in Piedmont. As some of them were said to have at least 100 seams, it is probable the plaiting was at that time very fine. In England the manufacture was not introduced before the next century. Some account of it is given in the article HAT, vol. viii. p. 764. In Tuscany, where this work, which is known as the Leghorn plait, is carried to the highest perfection, a variety of bearded wheat (*triticum turgidum*) is grown solely for the straw, and the upper joint is selected as the best for plaiting. The straw is small, owing in part to the seed having been sown broadcast, and partly to the plant not being allowed to attain to maturity. It is spread on the ground to dry in the sun, and is further dried when tied in bundles and stacked. It is then again spread out to be bleached by the sun and dew, being frequently turned while thus exposed. The lower joint is then pulled off, and the upper portions are steamed and fumigated with sulphur. Thus prepared, the straw is largely exported to England. The best work is done in Tuscany in the spring season. In summer the dust and perspiration affect injuriously the appearance of the straw; and in winter the smokiness of the huts and the difficulties of plaiting the wet straw with cold and benumbed fingers also interfere with the excellence of the work. The hats tarnished in the manufacture from these causes cannot be restored by bleaching or other processes. The Tuscan straw, owing to its small size, may be used without splitting; but the English, to produce as fine work with their large wheat straws, were obliged to adopt the expedient of splitting the straw into narrow splints or slips. This was first done by knives, and afterward by the machines described in the article HAT. The introduction of this simple process had increased the returns in this branch in 1810 not less than £300,000 or £400,000 annually. The society of arts gave great encouragement to the manufacture, which led to various improvements in the processes. Rye straw was substituted for wheat straw, and the manufacture was extended to the Orkneys, to the climate of which the former variety was better adapted. As the split straw when plaited presents alternately its inner and outer surface, the work lacks that uniformity of appearance produced by the whole straw. To secure this, the plan was devised, in the plait called the "patent Dunstable," of laying two splints with their inner surfaces together, which also increases its durability. The plaits are made of various widths, and by the usual method practised in England they are put together overlapping each other along their edges, and producing little ridges over the whole work; but the Leghorn plait is so made that the edges are joined by being as it were knitted together, so that there is very little waste of material by overlapping and no interruption of the pattern. The pieces are held fast by a thread which is drawn tight and concealed in the work. The first straw bonnet braided in the United States is said to have been made in 1798 by Miss Betsey Metcalf, afterward Mrs. Baker, of Providence, R. I. It was an imitation of a Dunstable bonnet which she saw in a store in Providence. A facsimile of it, also made by Mrs. Baker, is preserved in the collection of the Rhode Island society for the encouragement of domestic industry, and is regarded with no little interest as connected with the first step in a great branch of industry, which in Massachusetts alone is said to employ 10,000 persons and to produce 6,000,000 hats and bonnets annually. In Philadelphia also the production of straw hats is carried on upon a large scale, and straw braid for the purpose is imported from England, Switzerland, and Tuscany, and coarse straw hats for the southern trade are largely imported there from Canada. One of the largest factories is at Bridgeport, Montgomery co., near Philadelphia. The annual production of Philadelphia has been estimated at over $600,000, or $350,000 for hats and $250,000 for bonnets. Many varieties of plaited work are introduced in hats and bonnets, some distinguished for their extreme fineness, and others for their total disregard of this quality. The styles too are continually changing, and the work is variously modified by the introduction into it of other substances, as lace, mohair, whalebone, &c. Straw is bleached with sulphurous acid, as described in HAT, and is dyed of various colors. A boiling hot solution of indigo in sulphuric acid gives a blue color; a decoction of turmeric a yellow color. Cochineal, salt of tin, and tartar are employed for producing a red; and various other dye stuffs are employed. —In Peru, Brazil, and other parts of South America, and in Central America, a straw is obtained from plants of the genus *bambusa*, which resemble in their growth tufts of marsh reeds, and are of a delicate green color. This is largely applied to the manufacture of hats and cigar cases; the former are distinguished as the most durable of all straw hats, and are known by the name of Panama hats, from the principal port of their shipment. They are manufactured by the Indians, whole colonies of whom, as that of the Moyobamba on the Amazon to the north of Lower Peru, are wholly devoted to this employment. The plants are cut before their full development, and are steeped in hot water until they become white. After being dried by artificial heat, they are exposed to the sun several days to bleach, and are then distributed throughout the districts where the manufacture is carried on. The men, women, and children engaged in it are described as sitting outside their cottages, smoking cigarettes, and plaiting the straw upon a block of wood which they hold between their knees. Commencing at the centre, they continue the plaiting in a spiral, finishing an ordinary hat in 2 or 3 days; but the finest hats occupy several months to complete them, and require especial care in the selection of the straw and the plaiting. The remarkable strength and flexibility of the straw admit of the hats being rolled up in small packages, so that they may be carried in the pocket without injury; and they are so closely plaited as to be water-proof. Their price varies with the quality from $2 or less to more than $100 each. The trade with the Indians is much impeded by their slow methods of dealing, the sale of each hat being a separate bargain involving long delays, so that a whole day is often occupied in buying 20 of them. The annual exports of these hats from Panama have been estimated at 60,000 to 80,000, and from Moyobamba at over 10,000.—The application of straw to the manufacture of paper has been noticed in the article PAPER, vol. xii. p. 735. In England it is thus employed mixed with rag pulp in a number of paper mills, and is said to produce a pretty good article for newspapers. By a late German invention a good paper pulp is said to be prepared from straw alone by the following process: The straw is steeped entire in soft water at a temperature of 55° to 85° according to the season of the year. Active fermentation takes place, and after steeping 60 hours, the water is run off and the straw is well washed with a fresh supply. It is then drained, and while still damp it is rolled flat under heavy stones or between rollers, and is then split up into long filaments between other rollers furnished with cutters. These are dried by exposure to the sun and air, and may be partially bleached by again wetting and drying in the sun. Various chemical preparations, as a solution of the hypochloride of lime, may be used to perfect the bleaching, when they are treated either with alkaline solutions or solutions of hypochloride of soda or potash, and after this are steeped several days in other mixtures, from which they are easily converted into pulp.

STRAWBERRY, a well known garden fruit, cultivated under a great many varieties and sub-varieties, bearing distinctive names. From an old custom of laying straw under the ripening fruit, the word strawberry originated, while the generic name of *fragaria* was derived from the Latin *fragrans* on account of its delicious perfume. According to Linnæus there are but two species, and more modern botanists are inclined to the same opinion, though many writers undertake to make out several. They are both found in America and in Europe, and are the common (*F. vesca*), with thin, plicate, light green leaves, hairy beneath, the sepals reflexed and the achenes or seeds on the surface of the fruit; and the wild (*F. Virginiana*), having smooth dark green leaves, the sepals spreading, and the seeds imbedded in the fruit. Morphologically the strawberry fruit is in reality what are commonly regarded as the seeds, the edible part being only an enlarged receptacle of the flower. Mr. T. A. Knight, in the "London Horticultural Transactions," vol. iii. p. 207, decides from many experiments that 3 alleged species, *grandiflora* from Surinam, *Chiloensis* from Chili, and *Virginiana* from North America, are no more than varieties of one plant; and the same may perhaps be proved as regards certain other species which might have originated from the *vesca* or wood strawberry. Long cultivation has effected many changes in the habit and form of foliage and fruit, and even some of these might occur naturally. Horticulturists have however grouped the hybrid kinds into 7 classes, viz.: from *F. vesca* the alpine, from its variety *elatior* the hautbois, and from its variety *collina* the green-fruited or green pine; while from *F. Virginiana* and its varieties have sprung the scarlet, black, or brown fruited, the common pine, Wilmot's superb, Hovey's seedling, and the like, all the very largest sized berries.—The cultivation of the strawberry has given rise to hybrid sorts of remarkable firmness of flesh, juiciness, richness of flavor, and magnitude of fruit. Generally speaking, the soil for successful culture should be deep, rich, and well pulverized, the plants set in rows 18 inches apart, and the plantation renewed every year or two. Particular kinds are found to do better in certain districts than in others; yet care in planting, freedom from weeds, and a good soil are the principal requisites. Certain sorts become defective in perfect stamens, and such as are staminiferous should be partially planted with them. The commercial value of the strawberry crops in favorable seasons renders the raising of this fruit very profitable.

STRAYS. See ESTRAYS.

STREET, Alfred Billings, an American poet, born in Poughkeepsie, N. Y., Dec. 18, 1811. At 14 years of age he removed with his father to Monticello in Sullivan co., where he was admitted to the bar, and for several years practised law. In 1839 he settled in Albany, where he has since resided, and where for a number of years he has held the position of state librarian. He commenced his literary career as a contributor of verses to the magazines, and in 1840 delivered a poem on "Nature" before the Euglossian society of Geneva college; and he has since delivered several poems before different colleges in New York, and one before Yale college. In 1842 appeared his first volume of poems, under the title of "The Burning of Schenectady, and other Poems," followed in 1844 by a 2d collection, "Drawings and Tintings," and in 1846 by a complete collection of his fugitive poems (8vo., New York). In 1849 appeared in London and New York his longest poem, "Frontenac," consisting of 7,000 lines. In 1860 he published two prose volumes: "The Council of Revision" (8vo.), containing the vetoes of the council, a history of the supreme, chancery, and admiralty courts of New York, and biographical sketches of its governors and judges from 1777 to 1821; and "Woods and Waters, or the Saranacs and Racket," a description of a tour in the great wilderness of northern New York. Several of his poems have been translated into German.

STRELITZ. See Mecklenburg.

STRELITZES. See Guards, vol. viii. p. 537.

STRENGTH OF MATERIALS, a general expression in the constructive arts for the measure of capacity of resistance, possessed by solid masses or pieces of various kinds, to any cause tending to produce in them a permanent and disabling change of form or positive fracture. (See the articles Arch, Beam, Bridge, and Carpentry.) The present notice will be devoted mainly to the general principles of the subject. The materials employed in construction are chiefly of 4 kinds: 1, timber; 2, rock (or natural stones); 3, bricks, concretes, &c. (artificial stones); 4, metals, especially iron. All these resist fracture in whatever way; but the capability of resistance in a given case varies with many particulars, but chiefly the following: 1, the nature of the material and its quality; 2, the shape and dimensions of the piece used; 3, the manner of support from other parts; 4, the kind and direction of the force tending to produce rupture. Materials of all kinds owe their strength to the action of those forces residing in and about the molecules of bodies (the molecular forces), but mainly as well as most obviously to that one of these known as cohesion, the direct result of the operation of which among the particles and within the fibres of any mass is to impart to it the property of toughness or tenacity. Certain modified results of cohesion, as hardness, stiffness, and elasticity, are also important elements; and the strength is rather in the ratio of the toughness and stiffness combined. Since the quality of the same kind of material must vary with a great variety of circumstances, some of them not readily cognizable by the experimenter or the engineer, it will follow that there must be a corresponding variation in the results as to strength obtained by different observers; that the numbers employed to express the strength afford at best but approximations; and that in practice the load or pressure allowed must fall considerably within even these limits. A timber or piece of other kind may be subjected to strain or fracture in 4 ways: 1. It may be stretched, pulled, or torn asunder, as in case of ropes, tie-beams, &c. This is called direct pull, tensile strain, or tension; and resistance to it, tensile strength. 2. It may be crushed in the direction of the length, as in columns and truss beams. This is direct thrust, direct pressure, or compression; and resistance to it, the crushing strength. 3. It may be bent or broken across by a force perpendicular or oblique to its length, as in common beams and joists. This is transverse strain, or flexion; resistance to it is the transverse strength. 4. It may be twisted or wrenched off, in a direction about its axis, as in case where the shaft or journal of a turning wheel is suddenly arrested in its movement. This is torsion; resistance to it, the torsional strength. A 5th sort is sometimes added, namely, detrusive strength, or that consisting in resistance to the sliding of the particles or fibres upon each other; hence, opposing such applications of force as those made in the operations of punching and shearing. Any bending or breaking pressure is a stress; its effect on the piece, a strain. Briefly, then, the strength of a solid piece or body, in any direction, is the total resistance it can oppose to strain in that direction. I. *Tensile Strength.* A rod, rope, or any body, being pulled or strained in the direction of its length (the form, in these cases, being usually cylindrical or prismatic), its cohesion can come into play only by reason of the opposite end being fixed; and the amount of cohesion excited is a reaction against the pull or strain applied. From these principles it follows that, up to the limit of strength, the amount of cohesion excited in the way of reaction is always exactly equal to the amount of the acting strain, rupture or permanent change following as soon as the latter has passed the limit named; and also, that at every moment the strain and reaction are equal throughout the whole length of the piece acted upon; hence again, that where weight does not (as it must in any hanging rope or piece) come in to modify the result, the piece must, when the limit of strength is exceeded, always part or yield at its weakest portion; and that the tensile strength can never exceed that of such weakest portion. Two fibres of like character, equally stretched, must exhibit double the strength of one. Generalizing this result, we say that the tensile strength of rods, beams, ropes, wires, or other pieces is, for each material, proportional to the area of the cross section of the piece used. This is, accordingly, also termed the absolute strength. And it is a corollary that, in pieces of like material, having all of them circular or all square cross sections, the tensile strengths are as the squares of the diameters or sides of such sections respectively. But these laws presuppose certain other conditions. 1. The strains must be each in the line of the axis of the piece, or the result is modified by tendency to cleave (in timbers), or by detrusive or transverse strain. 2. The lateral cohesions of the particles or fibres, and the comparative strengths of the several fibres, are supposed to be all equal; but so heterogeneous are most materials employed, that neither of these suppositions can in most instances hold true. When allowance for modifying influences of the kinds now named is made, the laws of tensile strength become safe guides in practice, though the behavior of different materials in yielding to tension may vary considerably. Any material, under a considerable tensile strain, becomes slightly elongated, not returning when the strain is taken off. This result is expressed by saying that the body possesses extensibility. It is doubtful whether in all materials, or in most, a result of this kind can be often or indefinitely repeated. But over this, the body lengthens a little by every pull in consequence of its elasticity; and this effect is not permanent, at least its whole amount is not so; the piece shortens again, when the strain is removed, by quite or nearly the amount of this lengthening. Thirdly, if the body, in addition to these two properties, possess that of ductility, when the limit of its extensibility and elasticity is reached, the particles upon the surface at the weakest point begin to slip upon each other; the body is by this action both permanently and sensibly lengthened, or drawn out; and as this extension does not, as in wire-drawing proper, take place under circumstances favorable to increase of toughness, the strength is with the first yielding impaired; while, if the load be not then diminished, the yielding portion must be drawn rapidly smaller until it parts completely. Thus, for ductile materials, the load beyond which permanent change must occur is the limit of strength. In metallic bars or links, timbers, &c., a considerable proportion of the actual strength is gained by means of the firm hold of the fibres laterally one upon another; as is proved by the fact that, of two ropes of like material and containing in their sections a like number of fibres, in one of which the fibres are twisted and in the other glued together, the strength of the latter is greater by at least one third. In ordinary ropes and cords, the strength is that of so many independent fibres, but made effective by means of the enormous friction between these due to the twist, by which the slipping and parting of the mass are prevented. Cords are weakened by overtwisting; but properly made, their strength increases, for a given thickness, with the fineness both of the fibres and of the strands into which these are first made. Damp hempen cords are stronger than dry ones, twisted than spun, unbleached than bleached, and tarred than untarred. Fibrous and solidified substances of animal origin, as tendons, silk, and glue, have remarkable strength. In the tables of strength which follow, and in which are given as samples the results obtained in reference to certain materials most in use, or otherwise important, the piece experimented on is (unless otherwise specified) always one the transverse section of which presents an area of 1 square inch; and the limits of strength found, known by the loads required to secure fracture, are expressed in pounds weight avoirdupois. Some results in respect to tensile strength are given in the following table:

1.—METALS.

Materials.	Limits of tensile strength.	Materials.	Limits of tensile strength.
Steel, best tempered	134,000—158,000	Iron, ship plates, average	44,000
Steel, cast, maximum	142,000	" cast	14,000 45,970
" shear	118,000	" cast, mean of American	31,800
" blister	104,000	Copper, wire	61,200
" puddled	67,200	" wrought	34,000
" plates, lengthwise	96,300	" cast, American	24,250
" plates, breadthwise	78,700	Platinum, wire	53,000
" razor	150,000	Silver, cast	40,000
Iron, wire	78,000—108,000	Gold, cast	20,000
" best Swedish bar	72,000	Tin, cast block	3,800
" bar, mean by Barlow	56,560	" Banca	2,122
" bar, inferior	30,000	Zinc	2,600
" boiler plates, average	51,000	Bismuth	2,900
		Lead, wire	2,580
		" cast	1,800

2.—OTHER MATERIALS.

Glass, plate	9,400	Mortar, of 20 years	52
" flint	4,200	Roman cement, to blue stone	77
Hemp fibres, glued	9,200	Wood, box	14,000—24,000
Hemp fibres, twisted (rope)	6,400	" oak	10,000—25,000
Manila rope	3,200	" locust tree	20,100
Marble, different species	9,000 5,200	" elm	13,200
Stone, different species	1,000 850	" ash	12,000
Brick, well burned	750	" fir	8,330
		" cedar	4,880

The strength of metallic bars is impaired by sudden, frequent, or extreme changes of temperature. The strength of alloys is, in many instances, superior to that of either of the component metals. An alloy of 6 parts Swedish copper with 1 of Malacca tin breaks at 64,000 lbs.; brass, at about 51,000; an alloy of 4 parts tin, 1 of lead, and 1 of zinc, at 13,000. According to Mr. Emerson, the load which may be safely suspended to an inch square is as follows:

Iron	76,400	Red fir, holly, elder, plane	5,000
Brass	35,600	Cherry, hazel	4,760
Hempen rope	19,600	Alder, aspen, birch, willow	4,290
Ivory	15,700	Lead	430
Oak, box, yew	7,850	Freestone	914
Elm, ash, beech	6,070		
Walnut, plum	5,360		

The numbers indicate considerable differences in the results as to ultimate strength, as obtained by different experimenters. Of iron, the tenacity is less at 212° than at 32°; but at 392° greater again than at 32°. A convenient rule for the strength of hemp or wire rope is to allow for each pound weight of the former, per fathom, a strength of 1 ton; of the latter, of 2 tons. Of wood, any species of which is subject to great inequalities, the strongest portion is said to be that neither nearest the pith nor the bark, but between the two. The wood from below the springing of the branches is stronger than that above, and that grown on the south side of the tree than that on the north side. The strength, per square inch section, of any material being known, this becomes for such material the unit or coefficient of strength; and hence, representing this unit for any substance by f, and calling W the breaking weight, and a the area of section in square inches, a general expression for the limit of tensile strength, according to the law found above, will be $W = f \cdot a$. That is, the strength of a piece of any other section is (approximately, of course) found by multiplying the unit for that material by the number of square inches in the transverse section of the piece. But long tie-beams become weaker by having first to do the work of upholding their own weight; and in a long rope, as used in towing, especially when wet, this becomes a serious element of weakness. A like result holds for a long rod or rope, pendent, and intended to support other weights; obviously such rod or rope, loaded, must tend to break near its upper end. Again, the safe load of any piece must diminish with increase of length, owing to greater probability of weak parts; and in some instances a like result arises from long continued pull, apart from the known deterioration, from decay, rusting, jar, &c., with age. II. *Crushing Strength.* This form of strength, or that which bodies can oppose to direct thrust, or pressure, is important in all materials having the form of blocks for foundations or walls, in columns, beams, &c. Mr. Hodgkinson finds this form of strength to be dependent in a marked degree (of course, after the nature of the material is regarded) on the proportion borne by the height of the piece to its other dimensions. For heights less than the diameter or side of the piece, the strength against crushing increases as the height is less—short, however, of such thinness as, in more fragile materials, would of itself favor fracture. When the altitude exceeded the diameter, fracture commenced by the cleaving off at the sides of pieces leaving a cone or pyramid of the column; the actual limit of strength was nearly the same up to a height of 4 or 5 times the diameter; beyond this altitude bending in flexible bodies was more likely to occur, and the strength rapidly diminished. Other things being equal, however, the strength was proportional to the area of section. Calling b the breadth, t the thickness, and h the height, Eytelwein had found for crushing strength the formula, $W = f \cdot \frac{b \cdot t^3}{h^2}$. For a solid cylindrical column, the ends flat, the height 30 or more times the diameter, Hodgkinson finds $W = f \cdot \frac{d^{3 \cdot 6}}{h^{1 \cdot 7}}$; and for a like hollow cylindrical column, $W = f \cdot \frac{d^{3 \cdot 6} - d_{,}^{3 \cdot 6}}{h^{1 \cdot 7}}$; d being the whole diameter of the column, and $d_{,}$ the less diameter in case of the hollow column. Here, as before, f is the unit or coefficient, varying with the kind of material; and this, being sought in tables, is to be multiplied by the ratio of dimensions above expressed. The table gives examples of crushing strength for short columns, of 1 square inch area:

Brass, fine	164,000	Marble, or granite, about	10,000
Iron, cast	146,000	Oak	6,000
" wrought	72,000	Brick	1,000

III. *Transverse Strength.* Suppose a beam stretched horizontally, supported at one or both of its extremities, and having a load placed upon the suspended portion at one or more points. If the beam were either incompressible or inextensible, it could not bend in consequence of the load, but, when the limit of strength was reached, must crush or snap asunder at once. But all materials are susceptible both of compression and of extension—different ones, however, in very different degrees, both as to each of these changes absolutely, and also as to their relative amounts. In fact, a beam supported at the ends or at other points is between any such points of support loaded, first, by its own weight within such length; if any load be then placed upon this portion, the effect is the same in kind, and simply increased in amount. The obvious effect is a deflection or flexure of the beam, under pressure of the sum of the weights its strength must bear. In this deflection the particles and fibres of the under side of the beam are extended, and the actual length of this portion is increased. The fibres are here in a state of tension, cohesion supplying the chief resistance to rupture. The fibres of the upper side of the beam are subjected, on the contrary, to compression; this part of the beam is really shortened; the resistance is that to crushing, and due to action both of repulsion and cohesion. The result is, that in either portion of the bent beam the fibres act by a sort of leverage, one component of their whole pull or pressure being exerted in a direction and amount exactly opposed to the whole transverse strain, at least so long as the piece is not bending, or until it breaks. Between the extended and the compressed portions of the beam there is evidently a continuous film or surface, horizontal when the beam is straight, and correspondingly bent when the beam is so, along which film the material suffers neither extension nor compression. This film, commonly spoken of as a line, is called the neutral line or neutral axis of the beam. Its importance in connection with the strength will presently appear. Since the fibres act by a sort of leverage, in either portion of the beam, most forcibly at the surface, and less and less, down to 0, at the axis, their total action in either portion must be determined by the number of them in it, and their average distance from the axis. In stones and cast metals generally, the resistance to compression is greater; in woods and wrought metals generally, the resistance to extension is greater. The place of the neutral line, in a general way at about $\frac{5}{8}$ the depth of rectangular beams, is variable slightly in unlike beams of the same form and dimensions. But in any case, in rectangular beams, the mean leverage either of the compressed or extended portion is at $\frac{1}{3}$ its depth. Hence, the entire transverse strength, the foregoing conditions alone considered, will be proportional to the product of the total number of fibres into the depth of the piece; that is, proportional to the product, *area of cross section* × *depth*; and therefore, as the product, *width* × *depth*². The dimensions in any two cases compared must correspond in denomination; it is convenient to express widths and depths in inches, and lengths in feet. Now, the strength of beams supported at both ends and loaded at the middle point between supports is generally (calling the breadth b, depth d, and length l) in the ratio $\frac{b \times d^2}{l}$; that is, it is directly as the product above named, and inversely as the length between supports. To find, then, the total strength of a rectangular beam of given material and section, it is necessary to seek its unit or coefficient of strength (that of the square inch section) by experiment or in tables; and having introduced this, the rule becomes, $W = f \cdot \frac{b \cdot d^2}{l}$. As examples, the unit, f, is, for good cast iron (short lengths, supported at both ends), about 2,548 lbs.; malleable iron, 2,050; Canadian oak, 588. Calling $\frac{2}{3}$ of this ultimate strength the limit of a safe load, the formula becomes, $W = f \cdot \frac{2b \cdot d^2}{3l}$. When the load is distributed equally along the beam, the strength is practically doubled. The beam being supported at one end only, and loaded at the other, the strength falls to $\frac{1}{4}$ of that obtained by supporting at both ends; but this is in like manner doubled by uniform distribution of load. For some materials, however, the formula gives a theoretical strength too great; for cast iron, by about $\frac{2}{11}$ of the total result. Remembering, now, that the total leverage of the fibres will be as the product of their number into their average distance from the neutral line, it will follow that, for the same quantity and kind of material, the strength can be increased, but within certain limits, by any change in the form of section that carries the fibres further from the neutral axis. When the area of the section is of oblong form, the strength when the beam rests on a narrower side is to the strength when supported on a flat side in the greater ratio of the depth to the thickness. Hence, plain rectangular beams are now seldom made square, but usually as flat prisms, and placed on the narrower side. But with a cross section containing a given total area of material, still greater gain of strength is secured by carrying a good part of the material out into two lateral extensions, called flanges, united by a vertical portion, the web, thus Ɪ. Here a positive gain arises through increased leverage; a negative, through saving of weight. For the ultimate transverse strength of rolled or wrought iron flanged beams, calling the depth d, area of section of lower flange A, and that of the web a, the following formula has been obtained: $W = f \cdot \frac{4d}{l}(A + \frac{a}{6})$. For further particulars in respect to flanged beams, and the differences required in flanges for wrought and for cast iron, see Beam. It has been calculated that with web and flanges of proper form the actual strength of wrought iron beams may be doubled, and of cast iron increased in the ratio $\frac{12}{11}$. In rectangular beams or bars of like material and similar sections, the strength will compare as the cubes of like sides; in cylinders, roughly, as the cubes of the diameters. A difference must be made in estimating the strength of any beam between cases of simple support from beneath, and those in which the end or ends are firmly fixed, as in a wall. The strength in the latter cases will be to that in the former in the ratio of about 3 to 2. The strength of a cylindrical beam is to that of a square beam of like diameter, as 4.71 : 8; that of a prism whose section is an equilateral triangle with the edge up, to that of one of square section and the same area, as 22 : 27; of the prism, equilateral, with the edge down, to a like beam with the edge up, as 38 : 23. In certain experiments upon beams having sections of different forms, the area being in all uniform, and equal to 1 square inch, fixed at one end, and the loads applied to the other at a length or distance of 1 foot, the following results were obtained: a cast iron beam, section square, broke with 678 lbs.; square, a diagonal of the section being vertical, with 568; cylindrical, 573; hollow cylinder, the greater diameter twice the less, 794; rectangular, depth 2 inches, breadth ½ inch, 1,456; rectangular, 3 × ⅓ inch, 2,392; do., 4 × ¼ inch, 2,652; equilateral triangle, edge up, 560; do. do., edge down, 958; T form, 2 inches deep × 2 wide × .268 thick, 2,068; same inverted, 555; oak, equilateral triangle, edge up, 114; do. do., edge down, 180. The strength of the largest square timber that can be cut from a tree is to that of the tree itself, as about 10 : 17. But since a beam must bend before breaking, and since a permanent bend is found considerably to reduce the strength for an added load, deflection becomes of itself an element of weakness. Let B denote the amount of deflection, and e the coefficient of elasticity (see Mechanics) of the given material; then, for given dimensions of the piece and amount of load, the deflection will be expressed by the following formula: $B = \frac{W \cdot l^3}{b \cdot d^3 \cdot e}$; and a given deflection being found experimentally to reduce the load borne by a certain amount, a corresponding deduction must be made for flexures greater or less. Sometimes the weight of a long beam so nearly breaks it, that a cut across its under surface (acting somewhat on the principle of the incipient fracture started by the diamond in glass) suffices to occasion complete rupture. Peschel advised to saw down into the upper part of a long beam near the middle, and drive in wedges; and in this way, flexure being more powerfully resisted, the strength is greatly increased. The practice of deepening the middle part of a beam, long between supports, appears to be actually injurious; since the maximum strength, with the load distributed, that can be secured with a given weight of material and length of piece, is obtained when the section is slightly less at the middle, and increasing toward the supports. The general principle is that the strength of a beam is increased by whatever contributes to its stiffness. This result is in carpentry secured by increasing or distributing the number of points of support; and also by a special contrivance of several connected pieces of less size, and so adjusted as to secure a continued thrust against or lift upon the middle of the piece to be stiffened. This arrangement, applied either below or above the piece, is called a truss, and the application of it trussing. Since the neutral axis of a beam or of a column contributes nothing to its stiffness or resistance in any way to transverse strain, it may be removed without diminishing the strength. Moreover, the force requisite to sever or bend any bundle of fibres increasing with distance of this from the axis, it follows theoretically that great increase of strength will be secured, with a given weight of material, by giving to this the hollow cylindrical or tubular form. This form more than any other, indeed, augments the strength toward bending or crushing strains. Tredgold finds that in such a cylinder, the inner diameter being to the outer as 7 : 10, the strength is doubled; and that it is greatest when the diameters are as 5 : 11. A rectangular beam, area 1 square inch, length 1 foot, sustained about 2½ tons; a hollow cylinder of like area of metal sustained 13½ tons; and a rectangular hollow beam, 8½ tons. Obvious instances of gain of strength and lightness at the same time by conformity to this principle, are seen in the long bones of the vertebrate animals, especially in those of birds, in the quill part of feathers, and in hollow stems, as the straw of wheat. Applications of the principle in the arts of construction have latterly attained to great importance; among them are the use of hollow iron columns in building; the tubular bridges; the cellular structure, as in the double sides of iron ships, the space intervening being cut up by transverse plates, made both to bind and brace between the two; and fluting or corrugation of metallic sheets or walls, which thus, though light, may have the stiffness and strength of much thicker ones. IV. The torsional strength, being rarely of importance in practice, may be omitted.—It has often been observed that wheels, chains, beams, cranes, and other iron structures, after being long subjected to blows or to distinct jarring during use or in any manner, at length break, and apparently without adequate cause. On the London and Blackwall railway, cars were run by a stationary engine, by means of a wire cable 6½ miles long. This, however well made, broke, it was found, after a time, though showing no visible wear or other deterioration. It is known that by continued rolling, hammering, or wire-drawing, metals lose their toughness and become fragile. It is asserted, and, though the question is yet somewhat in dispute, is probably true, that the tough metal is fibrous or laminated in structure, while the fragile or deteriorated pieces have become granular or crystalline. It is probable, therefore, that under continued agitation the molecules of the body undergo a new arrangement, in consequence of which its properties are changed, its tenacity and strength diminished. It has been proposed to call this condition fatigue of the metals. Applications of the principle are seen in the liability of cannon after being fired many times to burst, so that usually, after a certain number of discharges, pieces are now condemned and laid aside; and also in the danger from long use of breakage in car wheels, the chains used in hoisting from mines, in axles, &c. In two like structures of very different sizes, the larger is relatively weaker in consequence of its increased weight. At a certain size a structure would reach its 0 of strength for outside load, and beyond this would fall by its own weight. This result must follow because, while the strength of a structure is in a general way augmented in the ratio of the square of any certain dimension, the weight will increase usually as the cube of the given dimension. Of two like structures, one having its corresponding dimensions 4 times that of the other, the first will hence have a theoretical strength about 16 times that of the second, but a weight about 64 times that of the second. Hence, all unnecessary weight in the parts of a structure is a source of positive weakness; and in all our constructions a practical limit of size must be reached sooner or later. Hence, also, it is that we cannot judge of the effective strength of a structure from the actual ratio of strength afforded by its model. And a like principle furnishes one among the reasons why the smaller animals have relatively to their size a greater available strength than larger ones.—For further study of this subject the reader is referred to the works of Barlow, Fairbairn, Hodgkinson, Tredgold, and Emerson (English); to Tate on "Strength of Materials" (London, 1851); to the "Report of the Royal Commissioners on Iron" (London, 1849); and to a series of articles on "Strength of Materials, deduced from the latest Experiments of Barlow, Hodgkinson, &c.," in the "Journal of the Franklin Institute," Philadelphia, commencing in Nov. 1860.

STRICKLAND. I. Agnes, an English authoress, born at Reydon hall, Suffolk, in the early part of the present century. She was carefully educated under the personal supervision of her father, and at the age of 16 produced a poem in 4 cantos entitled "Worcester Field, or the Cavalier," which Campbell pronounced the best work of its class since the appearance of Scott's metrical romances. It was followed during the next few years by "Demetrius," a novel, of which the scene is laid in modern Greece; "The Pilgrims of Walsingham," a series of tales constructed on the plan of Chaucer's "Canterbury Pilgrims;" "Alda, the British Captive;" and several popular historical and biographical works for children. In 1840, in conjunction with her sister Elizabeth, she commenced the elaborate series of the "Lives of the Queens of England," completed in 1849 in 12 vols., which was followed by "Lives of the Queens of Scotland" (8 vols., 1850–'59). Both have proved very popular, and the biography of Mary, queen of Scots, in the latter series, by Agnes Strickland, is an elaborate attempt, founded on a variety of documents not previously consulted in detail, to establish the innocence of that sovereign. In 1861 she published "Lives of the Bachelor Kings of England," completing, with her "Queens," a continuous series of English history. At various times Miss Strickland has been a contributor of prose and verse to the periodicals, and a collection of her articles has been reprinted under the title of "Historical Scenes." II. Jane Margaret, sister of the preceding, commenced her literary career as a contributor to juvenile annuals and religious publications, to which occupation she devoted herself for several years. In 1854 she published "Rome, Regal and Republican" (2 vols. 8vo.). III. Catharine Parr (Mrs. Trail), sister of the preceding, has resided for several years in Canada, where her husband, Lieut. Trail, of the 21st regiment, was quartered, and has produced "The Backwoods of America," "The Canadian Crusoes," and "A Guide to Female Emigrants." IV. Susannah (Mrs. Moodie), another sister, married an officer in the same regiment with Lieut. Trail, and is also a resident in Canada. Her works comprise "Mark Hurdlestone" and "Flora Lindsay," novels, and "Roughing it in the Bush," a history of her personal adventures in the new world.

STRICKLAND, William P., D.D., an American clergyman and author, born in Pittsburg, Penn., Aug. 17, 1809. He was educated at the Ohio university, Athens, O., entered the itinerant ministry of the Methodist Episcopal church in Ohio in 1832, and was afterward for some years agent and district secretary of the American Bible society. In 1856 he removed to New York, where he has been engaged in literary labor, mostly in connection with the Methodist book concern. He is now (Jan. 1862) chaplain of the 48th New York regiment, stationed at Port Royal, S. C. His principal publications are: "History of the American Bible Society" (New York, 1849; new ed., 1856); "History of Methodist Missions" (1850); "Genius and Mission of Methodism" (1851); "Christianity Demonstrated" (1852); "Memoir of the Rev. James B. Finley" (1853); "A Treatise on Biblical Literature" (1853); "The Light of the Temple," a masonic work (Cincinnati, 1854); "The Astrologer of Chaldea" (Cincinnati, 1856); "Pioneers of the West" (New York, 1856); "Life of the Rev. Francis Asbury (Pioneer Bishop)" (1858); "Life of Jacob Gruber" (1859); and "Old Mackinaw" (Philadelphia, 1860).

STRONG, Caleb, an American statesman, born at Northampton, Mass., Jan. 9, 1745, died there, Nov. 7, 1819. He was graduated at Harvard college in 1764, studied law, and was admitted to the bar in 1772. During the revolution he was a member of the general court or legislature and of the Northampton committee of safety. For nearly 25 years after 1776 he was county attorney, in 1779 was a member of the state constitutional convention, and in 1780 of the state council, and several times represented his county in the state senate. In 1787 he was elected to the convention for framing a national constitution, but was obliged by sickness in his family to return home before the completion of its labors; and in 1789 he was elected one of the first U. S. senators from Massachusetts, was reëlected in 1793, and resigned in 1796. From 1800 to 1807 he was governor of Massachusetts, and again from 1812 to 1816. As a federalist he was opposed to the war with England, and his conduct during the war was the subject of severe animadversion by his political opponents. When requisition was made upon him for troops, he, in common with the whole federal party of New England, denied the right of the president upon constitutional grounds, and stood aloof from the contest, until what seemed to be a retaliatory act of the administration in withdrawing nearly all the troops from the coast of Massachusetts, and the actual presence of the enemy, rendered it imperative that he should make every effort for the defence of the state. The constitution specified three cases in which the president could call upon a state for the militia, viz.: to execute the laws, to suppress insurrection, and to repel invasion. A difference of opinion arose between the president and the governor as to which was to decide that either of these exigencies existed. There had then been no judicial decision on the subject, and the opinion of the supreme court was asked on the questions whether the commanders-in-chief of the states had a right to judge of the exigency, and whether, when either of the three exigencies did exist, the militia could be lawfully commanded by any officer but of the militia. An answer to these questions was returned, signed by Theophilus Parsons, Samuel Sewall, and Isaac Parker, sustaining the governor in his interpretation of the constitution. But although Gov. Strong so emphatically declined answering calls which he considered unconstitutional, he was ready to adopt every measure which the safety of the state demanded, and to accede to all requests which he considered within the limits of his constitutional obligations; and the state throughout the war was amply defended, so that no evil resulted from the difference between the state and national authorities.

STRONG, James, an American theological writer, born in New York, Aug. 14, 1822. He was graduated at the Wesleyan university, Middletown, Conn., in 1844. In 1852 he published a "Harmony and Exposition of the Gospels," and in 1854 a "Greek Harmony of the Gospels" on a similar plan, and also an abridgment of the forms and questions upon it. He is also the author of brief manuals of Greek and Hebrew grammar, an outline of theology, and an "Appeal to Sunday School Efforts;" and of various articles, chiefly on biblical topics, in the "Methodist Quarterly Review," and a series of communications in the "Christian Advocate and Journal," on the subject of ministerial education, which elicited much controversy. He has been for several years engaged, in connection with the Rev. Dr. McClintock, on an extensive "Cyclopædia of Biblical, Theological, and Ecclesiastical Literature," which is now (Feb. 1862) nearly ready for publication. In 1856 he received, although a layman, the honorary degree of D.D. from the Wesleyan university. In 1858 he became professor of biblical literature and acting president of the Troy university, N. Y., which position he resigned in Dec. 1861.

STRONTIA, or Strontian, an alkaline earth, of which strontium is the metallic base, represented by the formula SrO, chemical equivalent 52, obtained from its nitrate by ignition. It was first distinguished from barytes by Dr. Hope in 1792, and was named by him from Strontian, in Argyleshire, Scotland, where the mineral compound containing it was found. Pure strontia is prepared in the same manner as barytes from its corresponding salts. It is a grayish white, porous substance, infusible, not volatile, of alkaline reaction, and having an acrid, burning taste. It slakes like lime, and dissolves in 2 parts of boiling water or 50 parts of cold water. It resembles barytes, but its salts are not poisonous like those of the latter substance. Combined with carbonic acid, it forms the mineral strontianite, which occurs in Scotland in veins traversing gneiss along with galena and heavy spar. It consists of strontia 70.19 and carbonic acid 29.81 per cent. It is of light shades of yellow or green, gray, or white, more or less transparent; lustre vitreous; hardness 3.5 to 4; specific gravity 3.605 to 3.713. Its chief interest is in its property of communicating a reddish tinge to flame. In the United States the mineral occurs at Schoharie and at Warwick, Orange co., and at several localities in Jefferson co., N. Y. Strontia also occurs combined with sulphuric acid, forming the mineral celestine or sulphate of strontia, which consists of strontia 56.4 and sulphuric acid 43.6 per cent. This is of vitreous lustre, white or faintly bluish or reddish, and more or less transparent; hardness 3 to 3½; specific gravity 3.95. Its crystals are modified forms of the right rhombic prism, and are found in great perfection and of large size on Drummond's island, Lake Huron.—The nitrate is the only strontia compound of importance. It is the ingredient used in fireworks for giving a crimson color to the flames, and is prepared by converting the native sulphate into the sulphuret by heating it mixed with charcoal in a crucible, and decomposing the sulphuret, dissolved in water, with dilute nitric acid. Colorless transparent crystals of slender octahedral form separate on the evaporation of the neutral or acid solution. The salt is insoluble in alcohol, but dissolves in 5 parts of cold and one half part of boiling water. A beautiful exhibition of red fire is prepared by treating bibulous paper with nitric and sulphuric acids, and, after washing out all the free acid and drying, saturating it with a solution of the nitrate of strontia or chloride of strontium. The chloride is prepared by using hydrochloric instead of nitric acid in decomposing the sulphuret. A mixture that deflagrates with a magnificent red color, but which is very dangerous to make and to keep, is prepared of 40 parts of nitrate of strontia, 5 of chlorate of potash, 13 of sulphur, and 4 of sulphuret of antimony. Its spontaneous explosion has been the cause of some frightful accidents.—Strontium, the metallic base, was first isolated by Davy in 1807, but was first obtained in a pure state by Bunsen and Matthiessen in 1855. It is a malleable metal, of pale yellow color, and burns in the air with a yellowish flame emitting sparks.

STROPHE (Gr., from *στρεφω*, to turn round), a division of the Greek choral ode, much the same as a stanza. Opposed to it is the antistrophe. The chorus recited these various parts of the poem with their faces toward the different sides of the theatre, and turned to the one or the other side as they began the respective divisions; hence the name.

STRUENSEE, Karl August von, a German statesman and author, born in Halle, Aug. 18, 1735, died in Berlin, Oct. 17, 1804. He was educated at the orphan house and the university of Halle, and in 1756 was appointed a lecturer on mathematics and Hebrew at Halle, and the next year professor at the military academy of Liegnitz. In 1769 he was called by his brother Count Struensee to Copenhagen to take charge of the finances of the Danish kingdom, and on his brother's downfall was imprisoned for a short time, but was soon released, returned to Prussia, and retired to his country seat at Alzenau in Silesia. In 1782 he was made councillor of finances and director of maritime trade at Berlin, and distinguished himself by measures which greatly increased the trade of Prussia. In 1789 he was ennobled under the name of Von Karlsbach, and in 1791 appointed minister of state, and president of the board of excise, which office he held till his death. He published several valuable works on military science, political economy, and commerce.—JOHANN FRIEDRICH, count, a Danish statesman, brother of the preceding, born in Halle, Aug. 5, 1737, executed at Copenhagen, April 28, 1772. His early education was acquired in Francke's orphan house, and he studied medicine at the university of Halle, receiving his diploma in 1757. He was soon after appointed public physician at Altona, and in 1768 was employed to attend Christian VII. of Denmark in his tour through Germany, France, and England. His agreeable and insinuating manners won the confidence of the king, and he was a ready companion in his profligacy. With consummate address, he gained the good will of the queen (Caroline Matilda, sister of George III. of England), who was at first prejudiced against him, and for nearly 3 years he was the actual ruler of Denmark. In 1770 he was intrusted with the physical education of the crown prince, afterward Frederic VI., and soon after caused the king to deprive Count Bernstorff of his seat in the council of state, and appoint Count Rantzau-Aschbach in his place. He obtained the recall from France of his profligate friend Enewold von Brandt, who had been banished some years before, and through him he accomplished many of his purposes. The king gave himself up to vicious indulgence, and two parties strove to obtain the power, the party of the queen dowager led by Count Bernstorff, and the party of the queen led by Struensee. The latter triumphed, and Struensee was appointed prime minister with almost unlimited powers. He soon persuaded the king to dissolve the council of state, and to institute in its place the commission of conference, composed of his own creatures. This measure, though confirming his power at the time, brought great odium on Struensee, as subverting, through the influence of a foreigner, the Danish constitution, and depriving the nobility of their hereditary power. Count Rantzau, who had been promoted by his influence, being deprived by this act of office, went over to the party of the queen dowager, and became one of his bitterest enemies. The finances of the country were in a bad condition, and by injudicious measures of taxation he increased the public hostility to his administration. Scandals were circulated in regard to his relations with the queen, and he suppressed them by silencing the press. The party of the queen dowager, bitterly hostile to him, sought an opportunity of destroying him, and the partial failure of his intellectual powers, overtasked by his labors and his licentiousness, soon furnished it. The king was forced by the queen dowager and her partisans to sign an order for the arrest of Struensee and his brother, whom he had made councillor of justice, Brandt, Queen Caroline Matilda, and all their adherents, which was accomplished Jan. 16, 1772. Struensee and Brandt were tried by a special commission, and sentenced to decapitation, their right hands to be cut off, their bodies quartered and broken on the wheel, and their heads and hands to be stuck upon a pole. This sentence was carried into effect in all its details. During his imprisonment Struensee professed penitence and conversion from scepticism to Christianity, and made a written confession of his errors and crimes.

STRUTT, JOSEPH, an English antiquary and artist, born in Springfield, Essex, Oct. 27, 1742, died in London, Oct. 16, 1802. At 14 years of age he was apprenticed to Ryland, the engraver, and he subsequently studied oil painting at the royal academy, although he never accomplished much in that line. A taste for antiquities led him to pass much time in the reading room of the British museum, and an examination of the rare manuscripts resulted in the preparation of his first work, "The Regal and Ecclesiastical Antiquities of England, containing the Representations of the English Monarchs from Edward the Confessor to Henry VIII." (4to., 1773). His remaining works comprise "Horda-Angel-Cynnan, or a Complete View of the Manners, Customs, Arms, Habits, &c., of the Inhabitants of England from the arrival of the Saxons" (3 vols. 4to., 1774–'6); "Chronicle of England" (2 vols. 4to., 1777–'8), intended to comprise 6 vols., but which from want of encouragement he terminated with the Norman conquest; "Biographical Dictionary of Engravers" (2 vols. 4to., 1785–'6); "Complete View of the Dress and Habits of the People of England, from the Establishment of the Saxons" (2 vols., 1796–'9); and "The Sports and Pastimes of the People of England" (4to., 1801), a popular work, and well known by Hone's edition (8vo., 1830). He left, beside some miscellaneous pieces, a fragment of a romance entitled "Queen Hoo Hall," which, at the request of Murray the publisher, was completed by Sir Walter Scott in 1808. Strutt also engraved a series of plates illustrating the "Pilgrim's Progress," and a number of single works. He died in poverty.

STRUVE, FRIEDRICH GEORG WILHELM VON, a Russian astronomer, born in Altona, April 15, 1793. He was educated at the university of Dorpat, and in 1813 was attached to the observatory of that city, of which he became director in 1817. In 1839 he was made director of the magnificent observatory of Pulkowa, which position he still retains, and was not long after made councillor of state. He has confined his labors as an astronomer principally to the observation of fixed and double stars, and has made large additions to the knowledge of these bodies. He has also been engaged in a variety of labors connected more or less intimately with astronomical science, such as the triangulation of Livonia, measuring the degrees of latitude in the Baltic provinces, measuring an arc of the meridian between Sweden and southern Russia, the observation of the eclipses of 1842 and 1851, &c. His most important works are: *Observationes Dorpatenses* (8 vols., Dorpat, 1817–'39); *Catalogus Novus Stellarum Duplicium* (Dorpat, 1827); *Stellarum Duplicium Mensuræ Micrometricæ* (St. Petersburg, 1827); *Études d'astronomie stellaire sur la voie lactée et la distance des étoiles fixes* (St. Petersburg, 1847); and *Stellarum Fixarum imprimis Duplicium et Multiplicium Positiones Mediæ pro Epocha* 1830, &c. (fol., St. Petersburg, 1852). He has contributed much to the "Transactions" of the academy of sciences of St. Petersburg.—Otto Wilhelm, son of the preceding, born May 7, 1819. Educated under his father's direction, and now second astronomer at Pulkowa, he has distinguished himself by numerous astronomical discoveries, including over 500 new double stars and a satellite of Uranus, and by some interesting conclusions in regard to the ring of Saturn. He has published narratives of two chronometric expeditions undertaken by order of the Russian government, and observations on Biela's comet.

STRUVE, Georg Adam, a German jurist, born in Magdeburg, Sept. 26, 1619, died in Jena, Dec. 18, 1692. He studied law at the universities of Jena and Helmstedt, and in 1646 was appointed professor of law in the former, and in 1648 assessor to the high court of the circle of Saxony. In 1667 he was appointed privy councillor to the duke of Weimar, and was selected as his advocate in the case of the succession to the duchy of Saxe-Altenburg. In 1674 he returned to Jena as professor of canon law and *ordinarius* of the judicial college, and in 1680 was appointed president of the regency at Jena, the duke being a minor. He published 13 elaborate treatises on law, of which the most important are: *Syntagma Juris Feudalis* (Jena, 1653); *Syntagmata Jurisprudentiæ Civilis* (1665); and *Jurisprudentia Romano-Germanica Forensis* (1670).—Burkhard Gotthelf, a German jurist, son of the preceding, born in Weimar, May 26, 1671, died in Jena, May 24, 1738. He studied at Jena and various other German and Dutch universities, and in 1692 engaged at Jena with one of his brothers in the pursuit of the philosopher's stone, in which they soon beggared themselves. He afterward devoted himself for two years to the study of the Scriptures and the writings of Tauler and Arndt, and in 1697 was appointed curator of the library of the university of Jena. In 1704 he succeeded Schubart as professor of history, and in 1712 was appointed by the university historiographer and councillor, and extraordinary professor of law. In 1717 he was appointed privy councillor by the reigning prince of Baireuth, and in 1730 by the Saxon court. He was one of the first to attempt to reduce statistics to a system. The most important of his numerous works is his *Corpus Juris Gentium* (Jena, 1743).

STRUVE, Gustav von, a German writer and politician, born in Livonia in 1805. He studied law at the German universities, was for some time secretary of the embassy of Oldenburg at Frankfort, and soon after settled as a lawyer at Mannheim in the grand duchy of Baden, where he made himself known as a liberal journalist, as a speaker in political meetings, and as a phrenologist. In 1848 he made two fruitless insurrectionary attempts to introduce a republican form of government into Baden, and after the first failure retired to Switzerland, where he published with K. Heinzen a "Plan for Revolutionizing and Republicanizing Germany." The second attempt ended with a defeat at Staufen. Being arrested on Sept. 25, he was sentenced on March 30, 1849, to imprisonment for life. He was however on May 24 liberated by the success of the revolution, and elected a member of the constituent assembly of Baden, in which he was the principal leader of the republican party. After the dissolution of the constituent assembly and the suppression of the revolution he went to Switzerland, which he was soon forced to leave. He then went to England, and in 1851 came to the United States, where he first commenced the publication of a political weekly journal (*Der Zuschauer*), and after its discontinuance devoted himself to the compilation of a universal history of the world. After the outbreak of the civil war in the United States in 1861 he entered the ranks as a private soldier, but was soon elected captain in the 8th regiment New York volunteers. Beside several works on phrenology, he has published *Das öffentliche Recht des Deutschen Bundes* (2 vols., Mannheim, 1846); *System der Staatswissenschaften* (4 vols., Frankfort, 1847–'8); *Geschichte der drei Volkserhebungen in Baden* (Bonn, 1849); *Weltgeschichte* (9 vols., New York, 1854–'8); and *Das Revolutions Zeitalter* (New York, 1859–'60).

STRYCHNIA, or Strychnine, a poisonous alkaloid obtained from several species of plants of the genus *strychnos*. (See Nux Vomica.) It was discovered in 1818 by Pelletier and Caventou in the nux vomica and bean of St. Ignatius, to the amount of 0.4 per cent. in the former, and 1.2 per cent. in the latter. The *S. tieuté* affords it most readily and of the purest quality, but this species is too rare to be of practical importance; and the bean of St. Ignatius for a similar reason is little employed compared with the nux vomica. Several methods are adopted for reducing the seeds to powder before extracting the alkaloid. They are rasped with a file, or softened by steam, then sliced and ground when dry; or, as practised by the large manufacturers, the whole seeds are macerated in dilute sulphuric acid, and steam is passed through them in a covered vat lined with lead. They are then ground, and the pulp is lixiviated or expressed. If pure water alone is used, the strychnia is obtained as an igasurate, and if it is acidulated with sulphuric or hydrochloric acid, then as a salt of these acids. After the infusion is concentrated, the salt is decomposed by adding lime, and the strychnia falls with the excess of lime and impurities. These being separated, boiling alcohol dissolves the strychnia, and by evaporation this is obtained in crystals, which may be purified and decolored by redissolving and crystallizing several times, or by converting into a sulphate with sulphuric acid, then decolorizing with animal charcoal, and recovering the strychnia by decomposing the salt with ammonia. The alkali brucia accompanies the strychnia, and may be almost entirely removed in the repeated treatment with alcohol, in which when cold brucia is much more soluble than strychnia. Their medicinal properties are very similar, but much less strongly marked in brucia. When strychnia is rapidly crystallized from its solution, it is a white granular powder; but if time be given it crystallizes in octahedrons or quadrilateral prisms. Microscopic crystals were observed by Dr. J. J. Reese of Philadelphia on evaporating single drops of water upon a slip of glass, when the quantity present could not exceed $\frac{1}{500,000}$ of a grain in weight. Some of the crystals appeared circular, others stellate and scalloped, intermingled with dentated crosslets. His paper upon strychnia in the "American Journal of the Medical Sciences," for Oct. 1861, presents much valuable information upon this substance and the means of detecting its presence, and is the authority for what follows respecting the methods of detecting it. Strychnia is an intensely bitter substance, one grain, according to Dr. Reese, dissolved in 25 gallons of water, communicating a perceptible taste when the mouth is forcibly rinsed with the water. It is without odor, and undergoes no change in the air. Exposed to heat, it is not volatile, but melts like a resin, and is soon decomposed. It dissolves in the volatile oils and in boiling alcohol, but scarcely at all in water, ether, or absolute alcohol. Its composition, according to Liebig, is represented by the formula $N_2O_{44}H_{24}O_4$, but other authorities give very different proportions of these elements. The salts of strychnia when in solution are decomposed by the alkalies and their carbonates and by tannic acid.—The effects of strychnia upon the animal system are very remarkable. It is one of the most active and deadly poisons known. One sixth of a grain of the pure alkali has been known to kill a dog in half a minute, and less than a grain would probably destroy human life. The strength of the commercial article is, however, very variable. The poison acts alike whether applied externally to a fresh wound or injected into the veins, and its effects are communicated by injecting the blood of an animal under its influence into the veins of another; they are exhibited by convulsions soon terminating in death. Various antidotes have been proposed, but in cases of poisoning there can rarely be time for their exhibition. Camphor taken internally is said to correct the poisonous effects, and chloroform is probably still more efficacious. Conium is the most exact antidotal or antagonistic remedy. A case is reported of a boy in Cortland co., N. Y., who took about two grains of strychnia in mistake for morphia, and was soon after seized with violent tetanic spasms, locked jaw, &c. Chloroform was administered freely, by inhalation and application along the spine, and in 10 minutes the patient became perfectly quiet under its influence. On withdrawing it the spasms returned; but by keeping him under the effects of the anæsthetic 4½ hours, the poison was absorbed and the boy recovered. As a medicine strychnia is employed for the same purposes as nux vomica, and is introduced into the system either by application to a fresh wound, injection into the veins, or by taking it internally in pills or in solution in acidulated water. The pills commonly contain from $\frac{1}{12}$ to $\frac{1}{8}$ of a grain each, and after the first dose the others are regulated according to the observed effects, the strength of the medicine being always uncertain. Strychnia is the most useful remedy against muscular debility and simple paralysis, and for constipation arising from debility of the muscular coat of the bowels.—The presence of strychnia, even in inconceivably small quantities, is indicated by several curious and most satisfactory tests. The chief of these, called the color test, depends on the property, peculiar to strychnia, of exhibiting a beautiful play of colors when, in the presence of sulphuric acid, it is brought in contact with certain oxidizing bodies, such as the peroxides of lead and manganese, bichromate of potash, ferridcyanide of potassium (red prussiate), and permanganate of potash. When a small fragment of strychnia on a white plate is moistened with a drop of strong sulphuric acid, and either one of these bodies is stirred in contact with it, a rich violet blue color appears, which very soon changes to a mulberry purple, and afterward to light red. Dr. Reese is positive that the reactions of some other substances cited as resembling those of strychnia under these circumstances are in reality different when the experiment is carefully made. So delicate is this test, that he succeeded in detecting by it the presence of strychnia in pure solutions containing only $\frac{1}{672,000}$ of the alkaloid. In mixtures, such as the contents of the stomach, containing organic substances, it is readily discovered when present in proportion equal to $\frac{1}{100}$ of a grain to a pint of the mixture, this being first reduced to a small bulk by evaporation. A drop of the matter to be tested is very carefully evaporated to dryness at a temperature too low for the strychnia to be decomposed, upon a clean white porcelain surface. A drop of pure and strong sulphuric acid, taken out of the bottle on the end of a finely pointed glass rod, is then placed near to the dry spot on the porcelain, and a little of it is to be drawn along in contact with the spot. Then a very small crystal of the bichromate of potash, or, better, of the ferridcyanide of potassium, is to be moved once or twice over the moistened spot, when the characteristic reactions will be observed in case of the presence of strychnia. Instead of using an oxidizing body, Dr. Letheby brings out the blue color from the spot evaporated to dryness on a piece of platinum foil, and moistened with sulphuric acid, by connecting the foil with the positive pole of a single cell of Grove's or Smee's battery, and the acid with the negative pole. This method is not found so satisfactory by Dr. Reese, for several reasons, as that already given. Both of them fail when morphia in equal or larger quantities than the strychnia has been added to the mixture of organic substances. Another method of detecting the presence of strychnia is by what is known as the frog test. If the body and hind legs of a frog are immersed in a strychnia solution, tetanic spasms ensue on the absorption of an exceedingly small portion of the poison; the same effect follows the injection of a few drops through the œsophagus, or into the tissue of the thorax or abdomen. The smallest sized frogs should be selected, not more than 1¼ inches long or of 50 grains weight. A frog weighing 29 grains treated for half an hour by the first method, in a solution containing one grain of strychnia to 8 gallons of water (each drop consequently representing $\frac{1}{430,000}$ of a grain), exhibited decided convulsions and suddenly died. This test, in connection with the color test and the extreme bitterness of strychnia solutions, is regarded as abundantly sufficient to determine the presence of the alkaloid. The frog test is particularly valuable because it is scarcely affected, if at all, by the presence of morphia.

STRYPE, John, an English divine and author, born in London, Nov. 12, 1643, died Dec. 13, 1737. He was educated at St. Paul's school and at Cambridge, and in 1669 became minister of Low Leyton in Essex, where he continued until a few years previous to his death. His principal works are: "Memorials of the most renowned Father in God, Thomas Cranmer, sometime Lord Archbishop of Canterbury" (fol., 1694); "The Life of the Learned Sir Thomas Smith" (8vo., 1698); "Historical Collections relating to the Life and Acts of Bishop Aylmer" (8vo., 1701); "Annals of the Reformation" (4 vols. fol., 1709–'31); and "Ecclesiastical Memoirs" (3 vols. fol., 1721). He published an edition of Stow's "Survey of London" (2 vols. fol., 1720), though Stow's matter was but little more than a nucleus for his own accumulations in antiquarian research. His works were reprinted at Oxford (29 vols. 8vo., 1822–'8), affording very valuable documents for the ecclesiastical history of England.

STUART, the name of a royal family of Scotland and England. The origin of the family is involved in some obscurity; but according to tradition, Fleanchus, son of Banquo, on the murder of his father by Macbeth, fled into Wales in 1055, where he married a daughter of a chief named Griffithar Llewellyn; the son of Fleanchus, Walter I. (died 1113), returned to Scotland, and became steward of the household of Malcolm III., which office was made hereditary in his family, and from which the surname Stuart was derived. Walter was succeeded by his son Alan, he by another Walter, 3d high steward, and he by Alexander, who in 1199 was slain in a battle with the Danes, and left his office to his son Walter III., who conspired against King Alexander II., and was subsequently poisoned by his wife Alda of Dembe. Walter's son and successor Alexander was regent during the minority of Alexander III. His son James was regent after the death of that king, and died in 1309. Walter III., who succeeded his father, married Marjory, daughter of Robert Bruce, in 1315, upon whom, in failure of the birth of an heir male to her father, the crown was settled by act of parliament at Ayr, April 26, 1315. Marjory died in giving birth to Robert, afterward Robert II. of Scotland; but David II., son of Robert Bruce by a second marriage, came to the throne in 1324 as a minor, and after a succession of regencies Robert the Stewart, in conjunction with the earl of Moray, became regent in 1334, having already distinguished himself in the battle of Halidon, when, though but 16 years of age, he commanded a division of the Scottish army. In 1335, the earl of Moray having been taken prisoner by the English, he concluded a treaty with Edward III. of England. In 1338 he was appointed sole regent, which office terminated in 1341 by the king's majority. In 1346, David being taken prisoner, he was again elected regent, and held the position till 1357, when David was released. On the death of David in 1370 he was unanimously declared king with the title of Robert II. The licentiousness of this monarch, the doubts of the legitimacy of the children of his first wife, and the chronic state of war with Great Britain, made his reign and that of his son Robert III. harassing and unfortunate for the people. Robert II. died in 1390, and Robert III. in 1406. The succeeding monarchs of the line (all of whom are treated in separate articles) were James I., assassinated in 1437; James II., who died a violent death in 1460; James III., murdered in 1488; James IV., slain in the battle of Flodden in 1513; James V., son of the preceding and of Margaret Tudor, sister of Henry VIII. of England, died in 1542; Mary, executed in England in 1587; her son James VI., who succeeded Queen Elizabeth as James I. of England, and died in 1625; Charles I., executed in 1649; Charles II., died in 1685; James II., who was expelled from the kingdom in 1688, and died in 1701, and was the last reigning male member of the family, though his daughter Mary, wife of William of Orange, came to the throne as queen regnant with her husband, and his second daughter Anne succeeded her in 1702, reigning till her death in

1714. The only son of James II., James Francis Edward Stuart, was a pretender to the throne of England, and died in Rome in 1766. His son Charles Edward Stuart (born in 1720, died in 1788), was a second pretender to the English throne. Henry Stuart, Cardinal York, brother of Charles Edward, was the last of the male line of the family, and with his death in 1807 it became extinct. Its chief branches in the female line are the houses of Savoy and Orleans and the duke of Modena, all descended from Henrietta Maria, daughter of Charles I., of which king the duke of Modena is the lineal representative, being thus, but for the act of settlement, heir to the crown of England. (See Charles Edward, James Francis Edward, and Stuart, H. B. M. C.).

STUART, Gilbert, a Scottish author, born in Edinburgh in 1742, or according to some authorities in 1746, died in Musselburgh, Aug. 13, 1786. He was educated at the university of Edinburgh, where he studied jurisprudence and general literature, and in 1767 published a "Historical Disquisition concerning the Antiquity of the British Constitution," which procured him the degree of LL.D. Encouraged by the success of his next work, a "View of Society in Europe in its Progress from Rudeness to Refinement" (1768), he made application for the vacant professorship of public law in the university of Edinburgh; and failing in this, on account of his character for dissipation, he repaired to London, and for several years was a contributor to the "Monthly Review." Returning to Edinburgh in 1773, he started, in conjunction with William Smellie, the "Edinburgh Magazine and Review," which for 4 years was made the vehicle of savage strictures from his pen on prominent Scottish authors. This embittered spirit is observable in his next work, "Observations concerning the Public Law and Constitutional History of Scotland" (8vo., Edinburgh, 1779), an attack on Dr. Robertson, whom he especially hated. In 1780 he published a "History of the Establishment of the Reformation of Religion in Scotland" (4to., London), and in 1782 a "History of Scotland from the Reformation to the Death of Queen Mary" (2 vols. 8vo., London), in which he again attacked Robertson, whose aspersions against the character of the Scottish queen he zealously repelled. This is considered his ablest performance. For several years subsequent to 1782 he lived in London, contributing articles written in his characteristic vein to the "Political Herald" and the "English Review," of which John Murray was the proprietor; and a few months previous to his death he returned to Scotland.

STUART, Gilbert Charles, an American painter, born in Narraganset, R. I., in 1756, died in Boston in July, 1828. He received his first instructions from a Scottish painter named Alexander, by whom, when about 18 years of age, he was taken to Edinburgh. His master dying soon after their arrival in that city, he returned to America, working his passage home, it is said, before the mast, and commenced practice as a portrait painter at Newport, R. I. He removed thence successively to Boston and New York; but finding the war of the revolution a hopeless obstacle to his prospects, he set sail in 1778 for London, where for a couple of years he led an irregular life, making little progress toward establishing a reputation, and often at a loss for actual necessaries. Having finally been introduced to Benjamin West, then at the height of his fame and influence, he received from him valuable assistance in money and instruction, and for several years resided in his family. These attentions were warmly acknowledged by Stuart, who painted a full-length portrait of his benefactor, which is now in the British national gallery. About 1781 he commenced practice in London on his own account, and soon rose to great eminence as a portrait painter, rivalling Reynolds and the best English artists of the day in that department. Among his numerous sitters were George III., the prince of Wales, the earl of St. Vincent, the duke of Northumberland, Sir Joshua Reynolds, John Kemble, Col. Barré, Alderman Boydell, and many other distinguished persons. Subsequently he resided successively in Dublin and Paris, and in the latter city painted a portrait of Louis XVI. Returning to America in 1793, he proceeded, after a short stay in New York, to Philadelphia, for the purpose of painting the portrait of Washington. The first picture he destroyed; but at the second sitting he succeeded in producing the well known head from which he painted all his other portraits of Washington, and which has long been regarded as the standard likeness. The original study, together with a head of Mrs. Washington, is now in the possession of the Boston Athenæum. After residing several years in Washington, he took up his permanent abode in 1806 in Boston, where he continued in the active practice of his art until his death. His last work was a portrait of John Quincy Adams, which was finished by Sully. He had previously painted John Adams, Jefferson, Madison, Monroe, and most of the distinguished characters of the revolution and of the early period of the Union. His portraits of persons in private life are most numerous in Boston and its neighborhood, and these, like all his works, have lost nothing of their freshness or brilliancy through lapse of time. As a painter of heads he holds the first place among American painters, if we except Copley, and his flesh coloring rivals the finest efforts of any modern school. Upon the extremities of his figures, the draperies, and other accessories, he bestowed little labor, and they are sometimes finished in the most slovenly manner. He was superior to almost every other painter, according to Washington Allston, in "the faculty of distinguishing between the conventional expression which belongs to manners, and that more subtle indication of the individual mind. It was this which enabled him to animate his canvas not with the appearance of mere general life, but with that peculiar distinctive life which separates the humblest individual from his kind." Stuart was a man of fine social qualities, and a most accomplished talker.

STUART, Henry Benedict Maria Clement, Cardinal York, the last male representative of the Stuart family, born in Rome in 1725, died in Venice in 1807. He was the younger brother of the pretender Charles Edward, whom he was preparing to aid with a body of French troops assembled at Dunkirk, when the overthrow of the Jacobites at Culloden ruined the Stuart cause in Britain. He subsequently took orders in the Roman Catholic church, and in 1747 was appointed by Benedict XIV. a cardinal. On the death of his brother in 1788 he assumed the title of king of England as Henry IX., *gratia Dei, non voluntate hominum*, as the medal which he caused to be struck on the occasion declared. He was subsequently obliged to take refuge from French invasion in Venice, and during the last years of his life was dependent upon the British court for the means of subsistence.

STUART, James, sometimes called Athenian Stuart, an English antiquary and architect, born in London in 1713, died Feb. 2, 1788. In early life he was a painter of fans, a branch of art then greatly in vogue, and to which he devoted himself until about 1742. For several years subsequent to this he resided in Rome, and in 1750 he accompanied Nicholas Revett on an antiquarian tour to Greece, remaining in Athens from March, 1751, to the close of 1753. Returning to London in 1755, he set about the preparation, in conjunction with his fellow traveller, of a work on the "Antiquities of Athens," of which the 1st volume appeared in 1762, and the 2d and 3d posthumously in 1790–'94. Subsequent to his return to England, Stuart was much employed in London as an architect.

STUART, John, Earl of Bute. See Bute.

STUART, Moses, an American divine and author, born at Wilton, Conn., March 26, 1780, died at Andover, Mass., Jan. 4, 1852. He was graduated at Yale college in 1799, was employed for some time as a teacher, studied law, was admitted to the bar in 1802, and for the two succeeding years was a tutor in Yale college. He afterward studied theology, and was ordained pastor of the first Congregational church of New Haven, March 5, 1806. In 1809 he was appointed professor of sacred literature in the theological seminary at Andover, which office he held until 1848, when he resigned in consequence of the advancing infirmities of age. Beside 11 or 12 occasional sermons, and some other minor works, he published a "Grammar of the Hebrew Language without Points" (1813); "Letters to the Rev. William E. Channing containing Remarks on his Sermon recently preached and published in Baltimore" (1819); a "Grammar of the Hebrew Language with Points" (1821); "Letters to Dr. Miller on the Eternal Generation of the Son of God" (1822); "Commentary on the Epistle to the Hebrews" (2 vols. 8vo., 1827–'8); "Hebrew Chrestomathy" (1829); "Essay on the Question whether the use of Distilled Liquors or Traffic in them is compatible at the present time with making a Profession of Christianity" (1830); "Letters to Dr. Channing on Religious Liberty" (1830); a "Commentary on the Epistle to the Romans" (1832); "The Mode of Christian Baptism prescribed in the New Testament" (1833); "A Grammar of the New Testament Dialect" (2d ed., improved, 1834); "Hints on the Prophecies" (2d ed., 1842); "Commentary on the Apocalypse" (1845); a "Letter to the Editor of the North American Review on Hebrew Grammar" (1847); "A Scriptural View of the Wine Question" (1848); a "Commentary on Daniel" (1850); "Conscience and the Constitution" (1851); a "Commentary on Ecclesiastes" (1851); and a "Commentary on Proverbs" (1852). Professor Stuart was distinguished for great quickness and versatility of mind, indomitable perseverance, noble and generous impulses, and an enthusiastic interest in every subject that engaged his attention.

STUCCO (Ital.), a name applied to the hard external finish given to the coat of plaster upon walls, sometimes consisting of fine lime and sand without hair, hand-floated twice and well trowelled (see Plastering); but the term is more properly applied to a hard finish prepared of a mixture of ground marble or chalk, with pure lime as a cement, in such proportions and so worked as to produce a durable and uniform surface susceptible of polish. This sort is adapted for covering walls and internal decorations; but for external work the mixture is made of coarser materials and with cements adapted to withstand the weather. Pulverized alabaster or gypsum is sometimes used instead of marble, mixed with rich lime, carefully slaked and sifted, and then trowelled on to a rough coat until the surface is perfectly smooth. A solution of gelatine or strong glue or gum arabic is sometimes used instead of water to render the preparation more durable, and metallic oxides are added to produce desirable tints. The cements or stuccoes known in England as Keene's, Martin's, and Parian are made of plaster of Paris, mixed with a saturated solution either of alum, sulphate of potash, or borax, then dried in the air, and baked at a dull red heat. The preparation is pulverized and sifted, and is finally slaked with a solution of alum. Martin's is made with pearlash as well as alum, and is baked at a higher heat than the others. When the surface is perfectly dry, it may be polished by rubbing with fine grit stones, followed by tripoli powder, chalk, and oil. The application described in the article Scagliola is a variety of stucco.

STUHL-WEISSENBURG (Hung. *Székes Fejérvár*), a town of Hungary, capital of the county of the same name, situated on the left bank of the Csorgó, near the border of an extensive morass, 38 m. S. S. W. from Buda; pop. 22,600. The principal buildings are the cathedral and the episcopal palace. There are manufactures of woollen and linen goods, hardware, and several other articles. The kings of Hungary were formerly crowned here, and the cathedral contains many of their tombs.

STURGEON, the name given to the cartilaginous fishes of the class of ganoids and family *sturionidæ*. The body is elongated and fusiform, covered with a rough skin protected by 5 longitudinal rows of tubercular plates; the largest of these rows is along the back, and there is also one on each side, and one from each pectoral to the ventral fins; the plates are flattened, and marked with radiating striæ. The head is depressed, and ends in a long triangular snout covered with bony plates; mouth funnel-shaped and protrusible, on the under surface, without teeth, having in front a few depending barbels, evidently organs of touch; gill covers very large and gills free; pseudo-branchiæ and spiracles are present, but no branchiostegal rays; fins well developed, the dorsal and anal opposite and behind the ventrals; tail heterocercal or unsymmetrical, the vertebral cord being prolonged into the upper lobe as in the sharks, and strengthened by fulcra along its upper margin; a soft caudal on the under surface of the tail. The vertebral column consists of an undivided soft *chorda dorsalis;* the air bladder is very large, communicating freely with the œsophagus; there is a spiral valve in the intestine, and a conglomerate pancreas. They are generally of large size, inhabiting the northern temperate seas of both coasts of America, eastern Europe, and western Asia, from which they ascend the rivers in spring for the purpose of spawning, returning to the salt water in autumn; species are also found in the great American fresh water lakes, which never descend to the sea. They are oviparous; the food consists of any soft substances which they stir up from the bottom with their snouts, and of small fish; they have a habit of jumping out of water, generally considered for mere sport, but most likely to disengage from their gills and bodies the lampreys which eat into their flesh.—The genus *acipenser* (Linn.) has the characters of the family. The common sturgeon of Europe (*A. sturio*, Linn.) attains a length of 6 to 10 feet, and sometimes more; it is found in the Caspian and Black seas and the rivers opening into them, and sometimes on the coasts of Great Britain and the Baltic; the flesh is delicate, compared to veal, and was in old times considered a royal dish; it was served with great pomp in ancient Greece and Rome, but in modern days is held in far less esteem; still it is largely consumed in Russia, fresh, salted, and pickled. A larger species, also found in the seas and rivers of S. E. Europe, is the beluga (*A. huso*, Linn.), attaining a length of 12 to 15 feet and a weight of 1,200 lbs., and occasionally of much larger size; it ascends the rivers opening into the Caspian and Black seas, with other and smaller species. The flesh is tough and of inferior quality; the sound or air bladder furnishes an abundant supply of isinglass, for which great numbers are caught in Russia. (See Gelatine, vol. viii. p. 123.) Caviare is also made from the roe of the female, which sometimes constitutes ⅓ of the weight of the fish; the skin is used for harness leather, and the dorsal cord, cut in pieces and dried, is used as food. The sterlet (*A. Ruthenus*, Linn.), found in the Caspian, and growing to a length of 2 or 3 feet, furnishes a most delicate food and the best caviare. Some idea of the commercial importance of this fishery may be gathered from the fact that in 1829, in the Caspian sea alone, about 8,800 persons were employed, obtaining 786,000 sturgeons, yielding 28,500 lbs. of caviare and 1,100 lbs. of isinglass; the fish are taken in nets as they go up to spawn. The color in these species is brown of various shades, the plates whitish, and the abdomen silvery.—In North America sturgeons do not inhabit the rivers flowing into the Arctic ocean, and are not found north of the watersheds between lat. 53° and 54° N., where the mean annual temperature is about 33° F.; they seldom enter clear cold streams, but ascend muddy rivers in such numbers that many large Indian tribes subsist entirely on their flesh in summer; each watershed has its own species, varying in some minor characters. The sharp-nosed sturgeon (*A. oxyrhynchus*, Mitch.) attains a length of from 3 to 7 feet; it is found on the coasts of New England, New Brunswick, and Nova Scotia; it is common in Long Island sound from the middle of June to October, and is taken by harpoon and in nets; the smaller specimens are esteemed for the table; it is grayish brown above, silvery on the sides, and white below. The lake sturgeon (*A. rubicundus*, Lesueur) is olive brown above, white below, with the fins reddish; it attains a length of 4 feet, and is found in the great lakes and in the Ohio river. The short-nosed sturgeon (*A. brevirostris*, Mitch.) is dusky above and white below; the snout is short and blunt; it attains a length of 2 to 5 feet, and is so common in the Hudson that its flesh in the market has been known as Albany beef; it much resembles the *A. sturio* of Europe. Other species are described from the northern waters, the rivers of the N. W. coast, and from Lake Superior, by Richardson and Agassiz.—The genus *polyodon* (Lacép.) or *spatularia* (Shaw) has the general form of *acipenser*, but is without the bony plates on the body and head; the snout is very much elongated, and compressed into a thin leaf-like organ, partly bony and partly cutaneous, sometimes nearly as long as the body; gill covers very large, extending far back in a membranous point; the mouth is wide, with numerous minute teeth in the young animal, which are lost with age. The spoonbill sturgeon (*P. folium*, Lacép.) is steel-blue above and white below; it attains a length of 5 feet, and is found in the Mississippi, Ohio, and their tributaries; it is also called shovel fish and paddle fish; the flesh is occasionally eaten, but is rather tough; the singularly shaped snout is used to shovel up the mud in search of food. The genus *platirostra* (Les.) is probably only the adult of *polyodon*, the principal difference being the absence of teeth.

STURLESON. See Snorro Sturleson.

STURM, Johann, a German philologist, born at Schleiden, now in Rhenish Prussia, Oct. 1, 1507, died in Strasbourg, March 3, 1589. He studied at Liége in the college of St. Jerome, and in 1524 went to Louvain, where he spent 5 years, and, in partnership with Rudiger Rescius, established a press, and printed some Greek works. In 1529 he went to Paris, and there read public lectures on Greek and Latin writers and on logic; and thence in 1537 to Strasbourg to become rector of its newly established gymnasium, which, under his administration for 45 years, acquired great celebrity, and in 1566 was converted into a university. The system of education introduced by him, aiming chiefly at thorough Latin scholarship, exerted great influence throughout Germany, and was the model of that adopted by the Jesuits. He was several times employed by government in a diplomatic capacity. He was a Lutheran, but liberal to all who suffered for religious opinions, and was by the persecution of stricter sectarians finally driven from the head of his school. His works are very numerous, and are principally devoted to the elucidation of classic authors. His work on a system of education, *De Literarum Ludis recte aperiendis Liber* (4to., Strasbourg, 1538), has been several times reprinted.

STUTTGART, a town of Germany, capital of the kingdom of Würtemberg, situated on the river Nesen, a tributary of the Neckar, 38 m. E. S. E. from Carlsruhe and 97 m. S. E. from Frankfort; pop. in 1858, 51,655. It stands in a very beautiful valley surrounded by vine-clad hills, with well wooded mountains in the distance. The town is encircled by a wall and ditch, is entered by 8 gates, and consists of two parts, the ancient and modern, with two suburbs. In the chief square is a fine old Gothic church with a high tower, and many ancient sculptures and monuments of the princes of Würtemberg. The royal palace, begun in 1746 and finished in 1806, is a large building of freestone splendidly decorated and furnished in the interior; and the old palace, completed in 1570, resembles a feudal castle, and is now occupied by officials connected with the government. In the same square is a monument to Schiller by Thorwaldsen. The hospital church is a Gothic building, finely decorated in the interior, and contains the grave of Reuchlin. The town hall was built in the 15th century. The other public buildings and institutions of importance are the museum of natural history; a library of 200,000 volumes and 3,220 MSS.; a cabinet of medals containing about 17,000 specimens; a museum of the fine arts, with many valuable statues and pictures; a bazaar, and a theatre. Stuttgart has a gymnasium, military academy, polytechnic school, school of art, numerous schools, hospitals, asylums, and other charitable institutions, and extensive barracks and government offices. The manufactures include woollen, silk, linen, and cotton goods, jewelry, musical and philosophical instruments, leather, and tin ware. The book trade is extensively carried on, and connected with it are numerous paper mills, type founderies, lithographic establishments, and printing offices. The town has railway communication with all the principal places of Europe, and the Neckar is navigable. A considerable trade is carried on in different manufactured articles, and bark. In the vicinity are numerous parks and gardens, where the public are admitted, including Rosenstein, the summer palace of the king; and Kannstadt, about 3 miles distant, is resorted to by the citizens and visitors as a favorite watering place.—Stuttgart is a very ancient town, but the date of its foundation is not known. It suffered severely during the wars of the 16th and 17th centuries. Though repeatedly occupied by both sides during the wars of Napoleon, it escaped with little loss.

STUYVESANT, Petrus, the last Dutch director-general of New Netherlands (New York), born in Holland in 1602, died in New York in Aug. 1682. He served in the war in the West Indies, became director of the colony of Curaçoa, and, having lost a leg in an unsuccessful attack on the Portuguese island of St. Martin, returned to Holland in 1644. In 1645 he was appointed by the Dutch West India company director-general of New Netherlands, succeeding William Kieft, whose conduct had involved the settlers in a bloody war with the Indians, and created general disorder in the colony. He did not arrive till May, 1647, when he commenced a vigorous and often arbitrary administration, conciliating the savages and restoring order in every department. In 1650 he arranged at Hartford with the New England commissioners a line of partition between the Dutch and English territories, which had previously been undefined and a cause of frequent disputes. He was also involved in trouble with the Swedes on the south. In 1651 the Dutch built Fort Casimir on the Delaware, which was captured by Rising, the governor of New Sweden, in 1654. To revenge this wrong, Stuyvesant in 1655, with 7 vessels and between 600 and 700 men, sailed into the Delaware, and made a conquest of the whole settlement. Ten years of peace followed, disturbed only by the growing jealousy of the English, and by the civil discontents which the arbitrary character of Stuyvesant's administration tended somewhat to inspire. In 1653 a convention of the people, consisting of two deputies from each village in New Netherlands, had met and demanded that "no new laws shall be enacted but with the consent of the people; that none shall be appointed to office but with the approbation of the people; that obscure and obsolete laws shall never be revived." This assembly was dissolved by the governor, who commanded the members to separate on pain of punishment, telling them in his farewell message: "We derive our authority from God and the company, not from a few ignorant subjects." The spirit of resistance nevertheless increased, and was fostered by the large number of English settlers who had come to reside within the limits of New Netherlands. The encroachments of the New England colonies at last induced Stuyvesant himself to repair to Boston and lay his remonstrances before the convention of the united colonies, which met with but little favor; and a second embassy to Hartford had no better success. The Connecticut agents made exorbitant claims to territory by virtue of the royal patent. "In case there was another royal patent," said the Dutch commissioners, "between where would New Netherlands then lie?" "We know of no New Netherlands, unless you can show a patent for it from his majesty," was the cool reply. In 1664 Charles II. granted to his brother, the duke of York, the territory from the Connecticut river to the shores of the Delaware, and an English fleet under Richard Nicolls appeared in the bay in August and demanded the surrender of the city. Stuyvesant was unwilling to capitulate, but the municipality, seeing the futility of resistance, insisted on yielding. After holding out for a short time, the governor at last consented, and the city was given up on Sept. 8, 1664. After the capture Stuyvesant went in 1665 to report to his superiors in Holland, and afterward returned, spending the remainder of his life on his farm or *bouwerij* (whence the name of the street called the Bowery), then outside the limits of the city. He lies buried in the vaults of St. Mark's church in 10th street.

STY (Lat. *hordeolum*, from *hordeum*, barley), a small inflammatory tumor on the edge of the eyelid, about the size of a grain of barley. Sty has its seat in the cellular tissue at the margin of the lid, involving generally the roots of one or more of the eyelashes. The tumor is furuncular in character, and almost invariably goes on to suppuration; its progress is sometimes tedious and the suppuration imperfect. Sty is most common in persons of a strumous habit, and often has for an exciting cause derangement of the digestive organs. By attending to the condition of these organs the recurrence of the disease may be most generally prevented. When the little tumor has made its appearance, it is best to promote its maturation by warm and emollient fomentations. It is commonly advisable to leave it to burst of itself; but when maturation has occurred, if it occasion much uneasiness, it may be punctured.

STYLE, Old and New. See Calendar.

STYLITES (Gr. στυλιτης, belonging to a pillar), Simeon, a Syrian who lived in the first half of the 5th century, known in church history for having inaugurated a new kind of asceticism. He left his convent, and for 9 years lived under the open sky on a pillar, the top of which was only 2 cubits in circumference. Finally he ascended a pillar 20 yards in height, on which he lived for 30 years, and preached with remarkable effect to the crowds who gathered around him. The people of Antioch received his body into their city, and revered him as their patron saint. His example found several imitators in the East until the 12th century. In the West asceticism of this kind was little encouraged by the ecclesiastical authorities.

STYRIA (Ger. *Steiermark*), a duchy and crown land of Austria, bounded by Upper and Lower Austria, Hungary, Croatia, Carniola, Carinthia, and Saltzburg; area, 8,664 sq. m.; pop. in 1857, 1,056,773. It is divided into the circles of Gratz, which contains the capital of the same name, Marburg, and Bruck. A great part of the surface is mountainous, being traversed by three chains belonging to the Noric branch of the Alpine system, the highest summits of which are on the N. W. and S. W. frontiers, their culminating points, Grossenberg and Eisenhut, being respectively 8,381 and 7,676 feet above the sea. In the S. and E. part the mountains are of moderate height, and some of them separated by extensive valleys. The N. W. part is known as Upper Styria, and the country in the opposite direction as Lower Styria. The surface belongs to the basin of the Danube, toward which the drainage flows by numerous tributaries; the most important of these are the Mur, Enns, Raab, Save, and Drave, all of which, except the Raab, are navigable for boats. There are numerous small lakes, but none of any considerable size, and several cold, hot, and mineral springs. Limestone, sulphur, alum, rock salt, gold, silver, lead, copper, cobalt, zinc, and iron ore of superior quality, are all found. In the more elevated districts the climate is cold, but in the valleys it is mild and agreeable. The soil in the valleys is generally fertile, but the grain produced is barely sufficient for the consumption of the population. The vine thrives well in the valleys and on lower slopes. The mountains are generally clothed to their summits with timber, and the forests cover about half the surface. The inhabitants are mostly of German origin, but the Slavic Vindes or Sloventzi are also numerous; nearly all are Roman Catholics. Iron is extensively manufactured, and some of the mines were known to the Romans. Some linen, cotton, woollen, and silk goods are also manufactured; but the most important branch of industry is the felling and rafting of timber. Several millions of jews-harps are annually exported. An important transit trade between Italy and Germany is carried on, and is greatly facilitated by good roads, and by the Vienna and Trieste railway, which crosses the Semmering mountains.—Under the Romans the eastern part of Styria belonged to the province of Pannonia, and the western to Noricum. Christianity was introduced in the 4th century, but the northern barbarians afterward overran the province. Styria was annexed to Austria in 1192, was subsequently attached to Bohemia, and wrested from King Ottocar II. by Rudolph I. of Hapsburg, a possession of which house it has since remained.

STYX (connected with Gr. στυγεω, to hate, abhor), in Greek mythology, the chief river of the lower world, around which it flows 7 times. The name was said to be derived from the nymph Styx, the daughter of Oceanus, who, when Jupiter prepared to wrest the power from the hands of Saturn and the Titans, was the first of the immortals to answer to his call, coming with her 4 sons to his assistance. For her readiness he made her children his constant attendants, and upon her he conferred the distinction of being the oath-sanctioner of the gods. When a god was about to take the oath, a cup of water from this stream was brought him by Iris, and while pouring out this he took the oath. In the Hesiodic theogony Styx is called the daughter of Oceanus and Tethys. She was the mother of Zelos (zeal), Nike (victory), Bia (strength), and Cratos (power).

SUABIA. See SWABIA.

SUAREZ, FRANCISCO, a Spanish scholastic theologian, born in Granada in 1548, died in Lisbon in 1617. He early entered the order of the Jesuits, was in succession professor at the universities of Alcala, Salamanca, Rome, and Coimbra, and one of the most prolific theological writers of his age. Benedict XIV. and Bossuet accounted him among the most learned theologians of their church, and Grotius called him a profound theologian and philosopher, with whom but few could be compared. His work, *Defensio Fidei adversus Anglicanæ Sectæ Errores*, was ordered by the parliament of Paris to be burned by the public executioner, because it claimed for the pope a coercive power over kings. The complete works of Suarez were published at Lyons, Mentz, and Venice, in 23 vols. fol., the last named edition in 1748, and a new edition is now (1862) in course of publication at Paris. The Jesuit Noël published extracts from them in 2 vols. fol. (Geneva, 1732). A life of Suarez was written by Deschamps (Perpignan, 1671).

SUBJECTIVE. See OBJECTIVE AND SUBJECTIVE.

SUBLIMATION, a process of distillation in which the vapors condense in a solid form. It takes place naturally in volcanic fissures and craters, and the products, often of a sulphurous character, are deposited upon the walls. Deposits thus formed are termed sublimates. A great variety of mineral substances are subject to vaporize by heat and become solid again on cooling; and the number of such increases with the increased degree of heat which we can apply. Some vegetable substances also possess the same property, as camphor, benzoic acid, &c. Sublimation is much employed in the arts and manufactures as a means of separating volatile from fixed bodies, usually for obtaining the former in a purer state. The vapor is sometimes chemically changed by contact with the oxygen of the air, and the sublimate is then of a different composition from the original body, as when oxide of zinc is produced by subjecting the metal or its ores to heat exposed to the air.

SUBLIME PORTE (Fr., lofty or magnificent gate), the title officially given to the Ottoman government, and also applied to the edifice in which state affairs are transacted. Orkhan (1326–'57), the first Turkish sultan who adopted the title *padishah*, erected a magnificent palace with an imposing entrance, on which he bestowed the name of "Sublime Porte," which from that time to the present has been applied to the monarch and government ruling there. This use of the term also had its origin partly perhaps in the oriental custom of transacting public business at the gate of the city or palace.

SUBMERGED FORESTS. See FORESTS, SUBMERGED.

SUBPŒNA, a judicial process directed to a witness commanding him to appear at the court, to testify what he knows in the case therein described, pending in the court, under a certain penalty (*sub pœna*) mentioned in the process. If the court wishes to examine any books or papers which are in possession of the witness, a clause is inserted in the writ bidding him to bring them with him; and the subpœna is thence called a *subpœna duces tecum*. A subpœna ought always to be served at a reasonable time before the trial, in order that the witness who is summoned thereby may have time to arrange his affairs in contemplation of his absence, and may have convenient time to reach the court. The statutes generally regulate the matter, and usually require that for every certain number of miles distance, one day shall be added in estimating the time of service. The manner of service is also often prescribed by American statutes. In New York, for example, the mode of service is to show the subpœna to the party; to deliver to him a copy of the process, or a ticket containing the substance of it; and to pay or tender to him the amount allowed by law for travelling to and returning from the place at which he is required to attend, and his fees for one day's attendance. These fees for travel and daily attendance are also matter of express statutory provisions, and they differ in the different states. The subpœna ought to be served upon the witness personally, for otherwise he cannot be proceeded against as for a contempt if he neglects to appear. Service may be made by any person, and is proved generally by affidavit, or, if it be made by a sheriff or his officer, by a simple return or certificate of service. When a witness has been duly summoned, and his fees have been paid or tendered, or payment or tender has been waived, he is guilty of a contempt of court if he fails to appear at the appointed time, and may be proceeded against by attachment. The process of attachment rests not on the ground of any actual damage resulting from the party's failure to appear, but is given for the vindication of the dignity of the court; and if it be clearly shown that the court's process was wilfully disobeyed by the witness, he is condemned to fine or imprisonment, or whatever other punishment is ordered by statute for the offence. In Massachusetts, and probably in other states, the party actually injured by the non-appearance of the party summoned has a statutory action for all damages caused by his default.—The office of the subpœna at common law is simply to bring into court a witness whose evidence is sought. Chancery, borrowing the name of the writ, but giving it a far larger scope, issued it in order to compel a defendant in a cause to appear and answer upon oath the plaintiff's allegations. This sort of subpœna was invented or first used in chancery by John de Waltham, bishop of Salisbury, master of the rolls under Richard II.; the commons complained "of his subtlety" "as contrary to the course of the common law." It was in fact the cause and subject of some of the loudest complaints against the chancery jurisdiction; but it was finally acquiesced in and became the most effective process of the chancery courts, and thereby the means of much of its beneficent action. The prayer for the subpœna is usually included in the closing clause of the bill, and asks that the defendant "may be required to appear, to answer the bill and to abide by the decree of the court."

SUBSCRIPTION, in law, a contract by which one agrees to contribute with others for a common purpose. The word is sometimes applied to the sum of money subscribed. The contract of subscription depends for its validity upon the same principles and facts as other contracts. The subscribers may be sued for their subscriptions whenever the conditions upon which they have promised to pay are fulfilled, if the purpose of the contract is a legal one, and founded upon a good consideration, and if there is a party capable of maintaining the action. Subscription papers, however, are often hastily drawn up and carelessly expressed; no party is named to whom the amounts subscribed are to be payable; it is merely agreed to contribute certain sums to a specified object, leaving the mode of collecting these sums to be afterward provided for; and the inducement to subscribe is commonly either a benevolent object or the hope of future profit, without any immediate legal consideration. In short, the difficulty in the way of enforcing contracts of subscription has arisen frequently, we may say indeed chiefly, from the want of proper parties and of a valid consideration for the promise. In their disposition to uphold this class of contracts, if they can be upheld consistently with the rules of law, the courts have gone in some cases so far as to say that the subscribers to a common object may be treated as contracting with each other, the consideration of each subscription being the promises of the other contributors, each subscriber being thus liable to a suit by all the others. This doctrine however is against the weight of authority; and it may be regarded as pretty well settled that no action can be maintained on a subscription unless it is made in favor of some particular person or corporation in existence at the time, and capable of bringing a suit upon it. Thus it has been held that a subscription to the stock of a corporation to be afterward formed did not render the subscriber liable to a suit by the corporation after it had been chartered and organized. But where the subscription paper named a party who was to collect the sum subscribed, it was held that he might bring a suit against a subscriber. So when the paper provided that the money should be paid to a person to be appointed by the subscribers in a prescribed manner, it was held that such person, when so appointed, might sue on the subscriptions. And it has been held that a subscription for a good consideration, but which could not be sued for want of a party to whom the promise was made, may be the consideration for a promissory note payable to a party capable of bringing an action. There are many cases which hold that no action can be maintained upon a mere voluntary subscription for a charitable or other purpose, upon the ground that there was no legal consideration for the promise; and these cases would seem to be in accordance with the rule of law requiring an actual consideration for a promise in order to make it legally binding. There are other decisions, however, which undertake to raise a consideration from the promises of the other contributors; from the acts done and expenses incurred on the faith of the subscription; and from the express or implied promise or legal liability of the parties, in whose favor the subscription is made, to carry out its purposes. Where, by the express terms of the subscription, the promisee agrees to appropriate the funds to a particular object and in a particular way, upon the well settled principle of mutuality of contracts, his promise is a good consideration for that of the subscribers. Whether, however, the merely legal and implied liability of a charitable corporation or board of trustees to appropriate the funds subscribed in accordance with the provisions of their charter or trust is a sufficient consideration, without an express promise in the subscription paper, to support an action on a subscription in their favor, is a question on which there is some conflict of opinion. Subscriptions which rest on an express contract by the promisee to do some act beneficial to the subscriber, are in fact but ordinary contracts.

SUCCORY. See Chicory.

SUCHET, Louis Gabriel, a French general, born in Lyons, March 2, 1772, died in Marseilles, Jan. 3, 1826. He entered the national guard of Lyons in 1791 as 2d lieutenant of cavalry, became a chief of battalion, was present at the siege of Toulon in 1793, and was then transferred to the army of Italy. He received the rank of chief of brigade on the battle field at Neumark in April, 1797. He was selected as one of the commanders in the army of Egypt, but was detained by Brune as major-general in the army of Italy, in which he reëstablished order and discipline; afterward served as chief of staff under Masséna on the Danube, and again in Italy, where after Masséna took the command he was made general of division, and during the siege of Genoa, with a far inferior force, secured the capture of 15,000 Austrians with 6 standards and 33 cannon. He took part in the battle of Marengo and in the passage of the Mincio, and commanded the centre of the army of Italy at Bozzolo, Borghetto, Verona, and Montebello. In 1805 he commanded the left wing under Marshal Lannes at Austerlitz, and in 1806 took an important part in the battle of Jena. In 1808 he was made commander of a division in the army of Spain, and by his siege of Saragossa (1809), the taking of Lerida (1810), Tortosa and Tarragona (1811), and the occupation of Montserrat, won the baton of a marshal of the empire in 1811. He afterward took Oropesa, Murviedro, and Valencia, which place he entered Jan. 14, 1812, capturing 18,000 Spanish troops and immense stores, and was rewarded with the title of duke of Albufera and a large revenue. His justice and moderation gained him the affection of the Spaniards, and on the withdrawal of the French from Spain he left the country with honor. Louis XVIII. made him a peer of France in 1814. He wrote *Mémoires sur la guerre d'Espagne*, 1808–1814 (2 vols. 8vo., Paris, 1829).

SUCKER, the popular name of the soft-rayed fishes of the carp family (*cyprinidæ*) included in the genus *catostomus* (Lesueur). They are characterized by a single dorsal, 3 rays in the gill membrane, smooth head and gill covers, jaws without teeth and retractile, mouth beneath the snout, and lips plaited or lobed suitable for sucking; there are comb-like teeth in the throat; the intestine is very long, and the air bladder divided into 2 or more parts. There are about 30 species in the fresh water rivers and lakes of North America; they feed on aquatic plants, worms, larvæ, and mollusks, and rarely take bait; they are very tenacious of life; the young are devoured by kingfishers, fish hawks, and carnivorous fishes. The common sucker (*C. Bostoniensis*, Les.) is 8 to 15 inches long, of a brownish color, olive on the head, reddish with metallic lustre on the sides, and white below; it is common in New England and the middle states. The chub sucker (*C. gibbosus*, Les.) is 7 to 12 inches long, dark brown above, golden greenish yellow on the sides, anterior part of abdomen whitish, and fins dark; body convex in front of dorsal, and sides of head sometimes spiny or tuberculated; it is common in the ponds of the New England and middle states. The gray sucker (*C. Hudsonius*, Les.) is grayish above, and 18 to 21 inches long; it is found in rivers opening into Hudson's bay, in Columbia river and its tributaries, and in the fur countries. Other large species from the northern regions have been described by Richardson and Agassiz. Among the larger species of the western rivers are the Missouri sucker (*C. elongatus*, Les.), 2 to 3 feet long, in the Ohio river, black on the back, and hence called black horse and black buffalo; and the buffalo sucker (*C. bubalus*, Raf.), of about the same size, in the Ohio, Mississippi, Missouri, and their tributaries, brownish above, bronzy on the sides, and whitish on abdomen. These and other species are frequently used as food in the West.

SUCKING FISH, the popular name of the remora, a spiny-rayed fish of the genus *echeneis* (Linn.), so named from the Greek εχω, to hold, and ναυς, a ship. This genus was placed by Cuvier among the malacopterygians, near the cod family; Müller ranked it among the *discoboli* (lump fishes), with the goby family; Agassiz considers it as belonging with the scomberoid or mackerel family. The body is elongated, tapering behind, covered with very small scales; there are 4 perfect branchiæ; very small teeth on jaws, vomer, and palate, crowded and hardly distinguishable posteriorly; mouth small and horizontal, the lower jaw the longer; eyes above the angles of the mouth; ventrals thoracic, narrow, united only at the base, and apparently not used for attaching the animal to submarine bodies; head flattened. Above the head and anterior dorsal vertebræ is an oval disk, presenting from the middle to both sides oblique transverse cartilaginous plates, arranged like the slats of a Venetian blind; on the middle of the under surface are spine-like projections connected by short bands with the skull and vertebræ, and their upper margin is beset with fine teeth. According to De Blainville, this organ is an anterior dorsal fin, whose rays are split and expanded horizontally on each side instead of standing erect in the usual way. By means of this apparatus, partly suctorial and partly prehensile by the hooks, these fishes attach themselves to rocks, ships, and the bodies of other fishes, especially to sharks. The dorsal is opposite the anal, but the fins are weak, and these fishes accordingly adhere to sharks and other moving bodies, which transport them to places where food is abundant, and often from the tropics to temperate regions. There are 6 or 8 pyloric appendages, but no air bladder. The common sucking fish of the Mediterranean, so well known to the ancients (*E. remora*, Linn.), is from 12 to 18 inches long, shaped somewhat like a herring, dusky brown above and lighter below; it has 17 or 18 plates on the head; it occurs in the Atlantic ocean, on the British coasts, and has even wandered to the American shores. The Indian remora (*E. naucrates*, Linn.) attains a length of 2½ feet; it is olive brown above and whitish on the sides, and has 22 to 24 plates in the sucking disk; it is found in the Atlantic, on the American and African coasts, in the Red sea, Indian ocean, and even around Japan. On the Mozambique coast it is put to a practical use in catching marine turtles; a number are taken to sea in a vessel of water, and are put overboard when a turtle is seen, a rope fastened to a ring having been attached to the tail; in the instinct to escape they attach themselves to the nearest turtle, and both fish and reptile are hauled in together. The *E. lineata* (Bloch), of the tropical Pacific, has a very elongated body and only 10 sucking plates. Peculiar to the American coast is the white-tailed remora (*E. albicauda*, Mitch.); it is from 1 to 2 feet long, grayish slate above, with dark band on sides; the disk has 21 plates; it is not uncommon on the southern shore of Massachusetts and in Long Island sound, where it is generally called shark sucker. None of the species feed upon the fish to which they are attached, but upon small floating animals. For other sucking fish, adhering by means of the ventral fins, see LUMP FISH.

SUCKLING, SIR JOHN, an English poet and dramatist, born in Whitton, Middlesex, in 1608 or 1609, died in Paris probably in 1642. He was the son of the comptroller of the royal household under James I., and was educated at Trinity college, Cambridge. Succeeding to an immense fortune at the death of his father in 1627, he travelled for a while on the continent, and in 1631–'2 served as a volunteer in the forces under Gustavus Adolphus. Returning to England, he became one of the most brilliant ornaments of the court of Charles I., and was distinguished not less for his wit and gallantry than for his passion for gambling. At the breaking out of disturbances in Scotland in 1639 he equipped a body of 100 horse for the royal service, at a cost, it is said, of £12,000, but was disgraced by the pusillanimous conduct of himself and his men in an encounter with the Scots near Dunse, for which he was mercilessly ridiculed by the rival wits of the time. In the succeeding year he was elected to the long parliament; but, having joined in a plot to rescue Strafford from the tower, he was compelled to take refuge in France. His literary remains comprise 4 plays, a number of short poems dedicated to love and gallantry, a treatise on "Religion by Reason," and a collection of letters. His reputation at the present day rests almost entirely upon his poems. His works were published by Tonson in 1709, and in 1836 appeared "Selections from his Works," with a memoir by the Rev. Alfred Suckling.

SUCRE, ANTONIO JOSÉ DE, a South American general, born in Cumana, Venezuela, in 1793, assassinated in the neighborhood of Pasto, in Ecuador, in June, 1830. He entered the insurrectionary army in 1811, serving under Miranda, and afterward under Gen. Piar. In 1819 he attained the rank of brigadier-general, and was appointed to negotiate a suspension of hostilities with the Spanish general Morillo. He was not long after promoted to the command of a division sent from Bogota to assist the province of Guayaquil. Though repulsed at Huachi, he succeeded in the autumn of 1821 in effecting a favorable armistice with the royalist general Aymerich, and thus enabling the Peruvian division to form a junction with the Colombians. In May, 1822, he achieved the decisive victory of Pichincha, which was immediately followed by the capitulation of Quito. Having returned to Bogota, he was despatched early in 1823 as Colombian envoy to Lima, with an auxiliary Colombian army of 3,000 men. He found Lima in the hands of the royalists, and retired to Callao, where he was besieged till the successes of Gen. Santa Cruz in the south of Peru compelled the royalist general to evacuate Lima in July, 1823. Sucre attempted to coöperate with Santa Cruz, but the defeat of the latter rendered his return to Callao necessary. Bolivar soon after took the command of the liberating army in person, but after the battle of Junin relinquished it to Sucre, who, on Dec. 9, 1824, fought and won the battle of Ayacucho, the most brilliant battle ever fought in South America, capturing the Spanish viceroy La Serna, killing and wounding 2,600 royalists, and the next day receiving the surrender of Gen. Canterac, the Spanish commander, with 15 general officers and the whole army prisoners of war. Three days later he entered Cuzco in triumph, and immediately proceeded against Olañeta, who with a small body still held Upper Peru against the republicans. The death of Olañeta in April, 1825, placed both Upper and Lower Peru in Sucre's hands, and he assembled as speedily as possible a congress at Chuquisaca, which, in Aug. 1825, decided to form the new republic of Bolivia, to request Bolivar to draw up a constitution for them, to call their capital Sucre, and to invest the government for the time being in Gen. Sucre with the title of "captain-general and grand marshal of Ayacucho." In 1826 a new congress assembled to receive the constitution prepared by Bolivar, and Sucre resigned his captain-generalship, but was at once elected president under the new constitution. The revolution in Peru in 1827, which overthrew the government of Bolivar, exerted an unfavorable influence in Bolivia, and an insurrection took place in which Sucre was attacked and dangerously wounded. On his recovery in Aug. 1828, he resigned and returned to Colombia, but was at once made commander of the Colombian army of the south, and political chief of the southern departments of the Colombian republic. In this capacity he led his troops in a series of military operations which terminated in the defeat and capitulation of the Peruvians under Gen. La Mar at Tarqui, Feb. 26, 1829. He became a member of the constituent congress of 1830, and it was on his return to Quito from the session of that body that he was assassinated.

SUDORIFICS. See Diaphoretics.

SUE, Eugène, a French novelist, born in Paris, Dec. 10, 1804, died in Annecy, Savoy, July 3, 1857. The son of a surgeon in the imperial guard, his sponsors at baptism were the empress Josephine and Prince Eugène Beauharnais. He studied medicine, and was early appointed assistant surgeon in the royal body guard. In 1823 he followed the French army to Spain, and saw the siege of Cadiz and the taking of the Trocadero; was afterward transferred to the medical service in the navy, and in 1827 was present at the battle of Navarino. Inheriting a competence on his father's death, he gave up his profession to devote himself to painting and literature. His first works were the sea novels *Kernock le pirate* (1830), *Plick et Plock* (1831), and *Atar-Gull* (1831), beside a number of shorter tales collected under the title of *La Coucaratcha* (4 vols. 8vo., 1832–'4). These were printed at his own expense, and notwithstanding their immoral tendency and coarse style, their vivacity rendered them popular. An affectation of Byronic scepticism shone conspicuously in his *Salamandre* (1832), which met with decided success, and in his *Vigie de Koatven* (1833). In all these performances the author seems to delight in presenting vice triumphant and virtue persecuted and derided. Although ill prepared for such a task, he now appeared as a historian, and under the patronage of the government published the *Histoire de la marine Française au 17e siècle* (5 vols. 8vo., 1835–'7), which was a failure. *Cécile* (1835), one of his best novels, was followed by *Le marquis de Létorières* (1839) and *Jean Cavalier* (1840). He now assumed the advocacy of socialistic ideas and of the improvement of the condition of the lower classes. This change did not appear clearly in *Mathilde, ou mémoires d'une jeune femme* (6 vols. 8vo., 1841), an affecting narrative in which vice meets with retribution, but shone conspicuously in *Les mystères de Paris* (10 vols. 8vo., 1842), a work which, though presenting terrible pictures of vice and corruption, was for a while the most popular novel ever published, numberless editions being issued in France, and translations appearing in nearly all the European languages. *Le Juif errant* (10 vols. 8vo., 1844–'5) was still more objectionable, but was scarcely less successful on account of its being a merciless attack upon the Jesuits. These three novels respectively appeared at first in the *Presse*, the *Journal des débats*, and the *Constitutionnel*; they were followed by *Martin, l'enfant trouvé* (12 vols. 8vo., 1847) and *Les sept péchés capitaux* (16 vols. 8vo., 1847–'9). After the revolution of Feb. 1848, he undertook a serial work in which he held up aristocracy, monarchy, and the clergy to execration by narrating the sufferings of a proletarian family through ages, entitled *Les mystères du peuple*, which was continued from 1850 to 1856, and, being prosecuted for immorality and sedition, was suppressed in 1857. He wrote numerous other novels, and alone or in conjunction with others dramatized several of his works, but with indifferent success. In 1848 he was defeated as a candidate for the constituent assembly; but in 1850 was elected, after a lively contest, one of the deputies for the department of the Seine. He sat among the members of the mountain, but never spoke. On the *coup d'état* of Dec. 2, 1851, he was expelled from France, and retired to Annecy.

SUETONIUS TRANQUILLUS, Caius, a Roman historian, born about A. D. 70, died probably in the latter part of the reign of the emperor Hadrian. He was the son of a military tribune, and appears, through the influence of his friend the younger Pliny, to have obtained a similar office, which his love of letters induced him to transfer to a relative. Pliny subsequently helped him to become *magister epistolarum*, an office of considerable importance in the imperial household, and which gave the incumbent many opportunities of examining the state archives. From this position he was removed by Hadrian in 119 in consequence of an indiscreet familiarity with the empress Sabina. The remainder of his life was probably devoted to literary pursuits, and from the list of his works given by Suidas he must have been one of the most voluminous of Roman authors. His chief extant work is the *Vitæ XII Cæsarum*, in 8 books; beside which the treatises *De Illustribus Grammaticis* and *De Claris Rhetoribus*, and some brief biographies of Terence, Horace, Lucan, Juvenal, Persius, and Pliny the Elder, pass under his name. His lives of the Cæsars are anecdotical rather than historical, and their accuracy has been impeached by Heisen, Linguet, and others, although, as would appear from the researches of Krause (*De Suetonii Tranquilli Fontibus et Auctoritate*), without affecting their value in illustrating the period of which they treat. A marked feature of the lives of the Cæsars is the minuteness with which Suetonius relates the gross excesses of the emperors. His personal character, if Pliny may be believed, was above reproach. The works of Suetonius long enjoyed a considerable popularity, 15 editions having been published previous to 1500, of which the oldest with a date is that of Rome (fol., 1470). Among the best subsequent editions are those of Burmann (2 vols. 4to., Amsterdam, 1736) and of Baumgarten-Crusius, by Hase (2 vols. 8vo., Paris, 1828). The first English translation was by Philemon Holland (fol., London, 1606), and the latest by Thomson and Forester (Bohn's "Classical Library," 1855).

SUEUR, Le. See Le Sueur.

SUEVI, the collective name of a powerful group of migratory German tribes, who about the beginning of the Christian era are said by ancient writers to have occupied the larger half of all Germany. Cæsar describes them as dwelling between the Ubii and Sygambri on the W. and the Cherusci on the E.; that is, between the Rhine and the Weser. According to Strabo, they extended across the central parts of modern Germany, between the Rhine and the Oder, and as far S. as the head waters of the Danube. Tacitus seems to designate by the name Suevi the tribes of eastern Germany from the Danube to the shores of the Baltic. In the 2d century the collective appellation disappears, the single tribes of the group being designated by their distinctive names; later, however, other Suevi, an adventurous German people of mixed origin, appear upon the banks of the Neckar, where they gave rise to the modern name Swabia, and also in northern Spain, where they conquered Galicia in the early part of the 5th century.

SUEZ. I. An isthmus about 75 m. broad, lying between the Mediterranean and Red seas, and connecting the continents of Asia and Africa. With the exception of two small ridges of the respective medium heights of 30 and 45 feet, the surface is only elevated from 5 to 8 feet above the level of the adjoining seas, and has a general depression toward the Mediterranean. In places it is so low as to be covered with salt marshes or swamps, and it is supposed that at one time the two seas were united. There are some considerable lakes, generally dry for most of the year, and the rest of the isthmus is a barren sandy desert, uninhabited. Fresh water is exceedingly scarce, being only found in a few places. A canal, begun by Necho and finished by Darius, connected the Nile with the gulf of Suez, and some traces of it are still visible. Napoleon projected a canal between the Red and Mediterranean seas, and for many years this subject has attracted considerable attention in Europe. In 1852 M. de Lesseps, a French engineer, undertook to form a joint stock company to cut a ship canal, and two years afterward he obtained a firman from the pasha of Egypt conferring upon him the exclusive privilege of carrying out the project. In 1855 a commission of engineers from various countries examined the proposed route, and stated in their report that there were no extraordinary difficulties in the way. The company was formed in Jan. 1859, with a capital of $40,000,000, and the work was shortly afterward commenced. According to this project the canal is to extend between the town of Suez and the gulf of Pelusium, to be 90 miles long, 20 feet deep at low water level of the Mediterranean, and 330 feet wide on the surface. II. A gulf forming the N. W. arm of the Red sea, extending from its head in a N. W. direction for about 200 m. between Egypt and the peninsula of Sinai, with a breadth varying from 30 to 40 m. The Israelites are supposed to have crossed about 2 m. from the head of this gulf on their exodus from Egypt. III. A town of Egypt, situated near the head of the gulf, 77 m. E. from Cairo; pop. about 2,000. It stands in a desert, and is protected on the 3 sides by a wall mounting a few guns. The streets are unpaved, and the houses generally poorly built of sun-dried brick. It contains several mosques and khans, a Greek church, a custom house, a large hotel for the accommodation of European travellers, recently erected by the pasha, a bazaar, and some tolerable shops. Good water and vegetable productions are not procurable near the town, and supplies of both have to be brought from considerable distances. Vessels of a large size find safe anchorage in the roadstead about 2 m. off, but there is only sufficient depth of water for boats and lighters to come alongside the quay. Suez is connected with Alexandria by a railway 222 m. long, which passes Cairo, and crosses the Nile by a magnificent bridge 65 m. from Alexandria. The place derives its importance from being a port of the overland route between England and India, China, and Australia.

SUFFOCATION. See ASPHYXIA.

SUFFOLK. I. An E. co. of Massachusetts, bounded E. and S. by Massachusetts bay; area, 15 sq. m.; pop. in 1860, 192,701. It is composed of Boston and Chelsea, and is the most important county in wealth and population in New England. Its inhabitants are principally engaged in manufacturing and trading. The agricultural productions in 1855 were 3,160 bushels of rye, 3,256 of Indian corn, 9,010 of potatoes, and 1,039 tons of hay. (See BOSTON, and CHELSEA.) The county is intersected by numerous railroads. Capital, Boston. II. An E. co. of New York, comprising the E. part of Long island, bounded N. by Long Island sound, and E. and S. by the Atlantic, and drained by the Peconic river and several smaller streams; area, 950 sq. m.; pop. in 1860, 43,276. The surface is hilly and uneven on the N., but nearly level on the S.; the soil is generally sandy, but fertile along the sound. The productions in 1855 were 504,767 bushels of Indian corn, 151,649 of wheat, 262,067 of oats, 304,063 of potatoes, 104,183 of turnips, 634,405 lbs. of butter, and 41,505 tons of hay. There were 3 straw paper mills, 25 ship yards, 3 spar factories, 1 cotton and 2 cotton warp factories, 2 clock factories, 1 piano factory, 5 newspaper offices, 112 churches, and 146 schools. The coast is indented by numerous harbors and inlets, and the county includes several small islands. It is intersected by the Long Island railroad. Capital, Riverhead.

SUFFOLK, a county of England, bounded by Norfolk, Cambridge, Essex, and the North sea; area, 1,481 sq. m.; pop. in 1861, 336,271. It contains two county towns, Ipswich and Bury St. Edmunds; other chief towns, Eye, Aldborough, Orford, and Sudbury. The coast line extends about 50 m., and a great part of it is low and marshy. The county is watered by numerous streams, the chief of which are the Stour, Orwell, Lark, and Waveney; and there are several small lakes. The surface is undulating, with some flat and marshy tracts, and the soil is generally a rich alluvial loam. The manufactures, with the exception of agricultural implements, are trifling. Fishing is actively carried on upon the coast. There are many remains of antiquity, including the Roman castle of Burgh, the walls of which are still standing. Suffolk returns 9 members to parliament, 4 for the county and 5 for the boroughs.

SUFISM. See Soofeeism.

SUGAR (Arab. and Per. *sukkar*; Lat. *saccharum*), a sweet substance obtained from the juices of many plants, and in some of its varieties from animal fluids also. It constitutes an important article of food in very general use throughout the world, and is the chief source of nutriment in fruits, appearing in them as they ripen. Important as sugar is now regarded by the great proportion of the human race, it does not appear to have been generally known to the nations of antiquity, except to the inhabitants of China and India. The sweet calamus and sweet cane, of which mention is occasionally made in the Old Testament, were most probably the sugar cane, which may have been introduced from eastern Asia. But it must have slowly come into use; for the ancient classical authors, Strabo, Theophrastus, Arrian, and others, who allude to it, speak of it as a kind of honey obtained from a reed growing in India and Arabia; while Dioscorides and Pliny describe it as resembling salt, and only used in medicine. This substance, termed *σακκαρον*, is, however, in Smith's "Dictionary of Greek and Roman Antiquities" (art. "Saccharum"), described as "a natural concretion, forming on certain reeds, but more especially on the bamboo cane;" and it is added: "It would appear that Moses Chorenensis, in the 5th century, is the first author who distinctly mentions our sugar, that is to say, the sugar procured by boiling from the sugar cane." This does not conflict with the older allusions to sugar cane and its sweet juice, which it is evident was long previously eaten with avidity, as the Zooloo Caffres at the present time eat the Chinese sugar cane. (See Sorghum.) Yet Eratosthenes speaks of roots in India sweet to the taste even when boiled, in such manner that many have supposed he referred to sugar extracted from the cane. Others again agree with Dr. Moseley, who thinks the remarks of Pliny and Dioscorides applicable to the sugar candy which the Chinese are known to have made from ancient times, and which may very likely have found its way in small quantities even to Rome. Sugar canes were found in abundance near Tripoli in Syria by the crusaders; and Albert Aquensis, a monkish author of that period, speaks of the plant being cultivated with great care, and when ripe of the juice being beaten out in mortars, strained, and set aside till it concreted in a snowy or salt-like product. This was eaten with bread or with water, and was found more agreeable than honey. The Saracens introduced sugar canes into Rhodes, Cyprus, Crete, and Sicily, when they obtained possession of those islands in the 9th century. They also were acquainted with the method of making sugar, and the manufacture was soon permanently established in the countries of the Levant. From these sugar was carried to Venice as early as 996; and in the 12th century it was imported there more cheaply from Egypt than from Sicily. William, king of Sicily, in 1166 gave a mill for grinding sugar canes to the monastery of St. Benedict. The first sugar cane cultivated in Spain was in Valencia, introduced there by the Moors after their conquest of the country; the culture thence spread to Granada and Murcia. In the early part of the 15th century the plant was introduced into Madeira and the Canary islands, and from the latter it is supposed that the first plants were taken to Brazil; but it is not at all improbable that the sugar cane was a natural product of America; and it may be that it is only for the process of making sugar from it that the new world is indebted to the Portuguese and Spaniards. The first cultivation of the sugar cane in the West Indies was at the island of St. Domingo or Hayti, where it was successfully prosecuted at the time of the second expedition of Columbus, 1493 to 1495; and in 1518 there were 28 works for making sugar in operation. The soil and climate proved admirably well suited for the crop; and for a long time this island furnished the chief portions of the European supplies of sugar. Previous to the revolution, near the close of the last century, the export of sugar had amounted to 69,000 tons a year. The English began to export sugar from Barbados in 1646, and the trade soon gave employment to a large number of ships. The Portuguese also at the same period were sending large quantities of sugar to European countries from Brazil; and toward the close of the 17th century the culture had been generally established throughout the West India islands, in Mexico, all of Central America, the northern countries of South America, Peru, Chili, &c. Mention is made of the sugar cane among the indigenous productions of Virginia and North Carolina by the earliest settlers of the banks of the James and Neuse rivers; but it seems probable they must have mistaken for it the common reed. The plant appears to have been cultivated on the banks of the Mississippi for the first time about the year 1751, when some Jesuits brought it from St. Domingo, and settled just above the site of New Orleans. In 1758 the first sugar mill was built a little further down the river by M. Dubreuil on his sugar plantation. The culture according to some accounts prospered, so that in 1770 sugar was one of the staple products of the colony, and after the revolutionary war it was prosecuted so successfully by emigrants from the United States, that there were in 1803 as many as 81 sugar estates on the delta alone. But according to the statement of E. J. Forstall in De Bow's "Industrial Resources," vol. iii. p. 275, "the manufacture of cane into sugar does not appear to have commenced before 1764, when samples were sent to the mother country from the co-tate of Chevalier de Mazan, near the city (New Orleans) on the opposite bank. The cession of Louisiana to Spain at that epoch appears to have put a stop to that industry, for no further traces of sugar making are to be found until 1791, when the first sugar house under the Spanish government was erected by a Mr. Solis at Terre aux Bœufs in the parish of St. Bernard. The next was established in 1796 on a plantation where now stands Carrollton." The successful result of this operation laid the foundation of the sugar industry of Louisiana; which still, however, advanced very slowly, and at the time of the cession of Louisiana to the United States (1803) the number of sugar estates was very small. In 1818 the crop amounted to 25,000 hogsheads, and the cane was ground altogether by cattle. Steam power was introduced in 1822. The further progress of the culture is presented in the tabular statements at the close of this article. The sugar-growing district in this state is on both sides the Mississippi river, from 57 m. below New Orleans to nearly 190 m. above; on Red river, including Rapides and Avoyelles; on many of the bayous and their tributaries; the prairies of St. Martin, Vermilion, &c. In Texas the crop has lately become an important one; and it is increasing in all the gulf states. It is even cultivated to some extent, as will be seen in the tables referred to, in South Carolina, Tennessee, and Kentucky. Yet the climate of Louisiana itself is rather north of that best suited to the plant, the cane being frequently killed by the frost after starting in the spring, and at maturity in the latter part of October and in November, the effect of which is to materially diminish its production of sugar. In 1857 injurious frosts thus occurred in April as late as the 22d, and on the 19th and 20th of November. In November, 1859, the cold was very severe on the 12th, 13th, 14th, and 15th in all parts of Louisiana, the thermometer on the 14th standing at 25° F. at New Orleans, and thick ice being formed in the most southern parishes. The effect of this was that the cane was everywhere frozen, and land which had previously given above 2 hogsheads to the acre yielded barely half a hogshead, and this of inferior quality. The climate is also subject to long continued droughts which seriously injure the growing crops. From some other cause not well understood the product of sugar to the acre is not so great as it has been in past years. This may be owing to continued repetition of the same crop without adding manures to the land, or to the practice of reserving inferior canes for seed, while some have supposed it is caused by deterioration of the stock through continued use of cuttings from the same source. To remedy the trouble, in case of this being the cause of the deterioration, the United States government recently collected a new supply of canes from the northern parts of South America and distributed them among the planters. The sugar plantations are also often seriously damaged by the Mississippi river bursting through crevices in the banks and flooding the low country.—The sugar cane is said to be a natural product of some of the islands of the Pacific; and it certainly flourishes with great luxuriance in many of the tropical countries and islands of Asia. But though the chief, it is not the only source of the cane or crystallized variety of sugar either in the old or new world. This is also obtained from the beet root and the juice of the sugar maple tree, and of several trees of the palm tribe. Sugar was discovered in the parsnip, the white and red beet, carrot, and juice of the birch in 1747, by M. Margraaf, of the royal academy of sciences in Berlin; and in 1796 M. Achard analyzed the beet root in Berlin, and obtained from it 5 per cent. of white sugar and 3 of molasses. The high price of cane sugar rendered the discovery of some new source of it a matter of great importance, and a factory was established at Cumoom in Silesia for extracting it from the beet root. When in the time of Napoleon I. colonial products were excluded from France, this manufacture assumed still greater importance; and a great impulse was given to it by the offer of a premium of 1,000,000 francs for the best method of producing sugar from native products. The highest chemical talent of France was directed to this object, and the resulting discoveries and improvements were afterward applied with great advantage to the treatment of the sugar cane. The readmission of West India sugars on the return of peace nearly broke up the beet root manufacture, and this was only kept alive by the imposition of high duties on foreign sugars in 1820 and 1822. From that time the product rapidly increased, amounting in 1838 to over 86,000,000 lbs., or about 42,000 tons, in 1857–'8 to 150,000 tons, and in 1858–'9 to 130,000 tons. In Germany, Belgium, and Russia, beet sugar is also produced to a considerable amount. In 1858–'9, 36,668,557 cwt. of roots were consumed in 250 sugar refineries in the Zollverein. As 12½ cwt. of roots are considered equal to 1 cwt. of sugar, this should represent 146,674 tons of sugar. In the Austrian empire there were consumed 16,042,248 cwt. of beet roots. In Belgium the same year the product of beet sugar was 18,000 tons. The manufacture in these countries is encouraged by a protective duty. Russia is said to produce from 30,000 to 40,000 tons of beet sugar annually. The annual product of maple sugar in the United States has been estimated at about 27,000 tons. The manufacture is carried on in Pennsylvania, Ohio, New York, Michigan, the New England states, and also in the British provinces. A much larger quantity of sugar is obtained from the wild date and the gomuti palms than from the maple, the product being rated as $\frac{1}{34}$ of all the cane sugar manufactured. In India the process of extracting the sugar is very rude, causing much of it to assume the uncrystallizable condition. The crude, dark brown, deliquescent sugar, called in India *jaggery*, is the product of the evaporation of the toddy or palm juice. Beside these sources, cane sugar may also be obtained from the pumpkin, the chestnut, the young shoots of the Indian corn, and a large number of tropical fruits. The character of the Chinese sugar cane as a sugar-producing plant has been considered in the article SORGHUM; and the evidence at hand to the end of the year 1861 was unfavorable to the prospect of its yielding in this country crystallizable sugar to profit. But reports from Ohio published in Jan. 1862, give more favorable accounts of the success of the trials of the preceding year, and make mention of the exhibition of a number of fine samples of the sugar at a convention in Columbus, Ohio, on Jan. 7; and we learn that in the north-western states it is already a common article of commerce.—The sugars may be included in 4 principal varieties, of which that termed cane sugar, also called sucrose, is the most important, and is the common commercial variety. The second, called fruit sugar or fructose, exists in honey, treacle, and most acidulous fruits. It is a sirupy liquid, not crystallizable, though by boiling with dilute acids it may be partially converted into the next variety, which is crystallizable. The third sort is called grape sugar, starch sugar, or glucose. It exists in the juice of many plants, and constitutes the crystals which form in honey, and also the hard, granular, sweet masses common in old dried fruits, as raisins, figs, &c. It is also produced by boiling, with dilute acids, starch, cane sugar, ligneous fibre (as linen rags), sugar of milk, &c.; and is occasionally met with as a morbid constituent of the urine in cases of diabetes. It crystallizes in cubes or square tables, and from hot alcohol in anhydrous prisms. Its sweetening effect compared with that of cane sugar is about as 1 to 2½. Glucose is manufactured to a considerable extent at the starch factories in Europe from potato starch, or rather dextrine, and is made use of in the manufacture of beer and an inferior sort of alcohol, designed for conversion into French brandy by the addition of certain essential oils or flavorings. It is produced by the action of diastase upon the dextrine in the preliminary stages of malting and mashing, but is more expeditiously made by treating the starch with sulphuric acid. It differs from starch ($C_{12}H_{10}O_{10}$) only by containing in addition the elements of 2 more equivalents of water, and also 2 equivalents of water of crystallization, with which it parts when carefully dried, becoming then $C_{12}H_{12}O_{12}$. Melting in its water of crystallization at 212° F., this sometimes serves to detect its presence in cane sugar. It differs from this also in being much less soluble in water, and in forming definite compounds with alkaline and earthy bases, which decompose and become brown at temperatures from 160° to 212°. Other points of difference will be noticed below. The fourth variety, called milk sugar, sugar of milk, lactine, or lactose, occurs only in the milk of animals, and is inferior to the last described in sweetness. These substances all consist of carbon, hydrogen, and oxygen, the two latter elements always existing in the exact proportions required to produce water; for which reason, although these elements are not regarded as so combined, the compounds are sometimes spoken of as hydrates of carbon. While the highest grade of sugar, the cane variety, is readily converted into the inferior grape sugar, all attempts to reverse the process, which would be a discovery of immense value, have entirely failed. The comparative composition of the sugars as respects the proportion of water they contain is presented in the following table, which is based upon quantities of each containing 12 equivalents of carbon:

Sugars.	Carbon.	Water.
Cane sugar, $C_{12}H_{11}O_{11}$..........	72	99
Fruit sugar, $C_{12}H_{12}O_{12}$..........	72	108
Grape sugar, $C_{12}H_{12}O_{12}$, 2HO	72	126
Milk sugar, $C_{24}H_{24}O_{24}$..........	72	108
Ditto, dried, $C_{24}H_{19}O_{19}$..........	72	85.5

—Cane sugar, as first obtained on evaporating the saccharine juices, is a yellowish brown substance in coarse crystalline powder and lumps, more or less moist and sticky, and containing variable quantities of glucose, treacle, and several organic and mineral substances. Lime is one of the latter, and it is thought that its presence induces the change in crude sugars, which after a time become gummy and soft and lose a portion of their sweetness. The foreign organic matters present impart to the crude sugars their peculiar taste and smell, and betray their particular source. These disappear when the sugar is refined. The best brown sugar has little odor and is in large sparkling grains. When refined, the sugar is converted into a hard and brittle crystalline mass, and is often moulded into conical loaves. Its specific gravity is then 1.606, giving 1,606 ounces avoirdupois to the cubic foot. In the large crystals, known as sugar candy, obtained by evaporating a saturated aqueous solution, prepared at a temperature of 212°, the sugar is colorless; but in the crystalline grains it is of snowy whiteness owing to the numerous reflections and refractions from the crystalline faces. The form of the large crystals is that of rhomboidal prisms terminated by dihedral summits. If the solution be prepared at 230°, or be long boiled, the sugar forms an amorphous mass on cooling. Pieces of loaf sugar rubbed together emit a pale violet phosphorescent light. Sugar is soluble in about ⅓ of its weight of cold water, and in all proportions in boiling water. It is sparingly dissolved in boiling absolute alcohol, but deposited again when cold. At the temperature of 320° it fuses, and on cooling forms the amber-colored solid known as barley sugar. When the temperature is gradually raised to 400° or 420°, sugar loses two equivalents of water, and is converted into the dark brown substance called caramel, used for coloring wines. At a still higher temperature decomposition ensues, and a residue is left of very porous shining charcoal, about ¼ the weight of the original substance. Under the influence of yeast vinous fermentation takes place in solutions of sugar, by which this is first converted into fruit sugar, and then into carbonic acid and alcohol. Cane sugar is rapidly decomposed and charred by concentrated sulphuric acid. These properties serve to distinguish cane sugar from the other varieties. The solutions of the different sugars also present characteristic effects on polarized light, thus furnishing a very certain means of distinguishing the varieties. The method of thus testing them by the aid of an instrument invented by M. Soleil is described in the *Annales de chimie*, [iii.] xxvi. 175. The plane of polarization is rotated from left to right by cane sugar, rather more powerfully than by grape sugar, while fruit or uncrystallizable sugar produces a rotation from right to left. A fresh solution of grape sugar possesses a rotary power double that which it retains after some hours, or after it has been heated to 180° or more and allowed to cool. Its rotary power is not then affected if the solution is heated with an acid; but that of cane sugar is reversed when its solution is heated with $\frac{1}{10}$ its bulk of pure hydrochloric acid, and the temperature is raised for 10 minutes to 154° F.—In the preparation of sugar, a thick, dark brown or black, ropy liquid is drained off from the crystalline portion, which consists of the uncrystallizable sirup together with some cane sugar, and the impurities that may be present. It is called molasses, and is very extensively consumed as an article of diet, and also in connection with the skimmings of the sugar kettles for the production of rum. (See Molasses, and Rum.) A better article, called sugar house molasses, and sometimes treacle, of specific gravity about 1.4, is obtained in the process of refining brown sugars. The article called *melado* lately introduced in commerce is a low grade of sugar heavy with molasses, obtained from the settlings of the cisterns in which the molasses is collected, and from partial boiling down in vacuum pans without refining.—Sugar is employed in a great variety of ways as a nutriment and condiment; but though nutritious and promoting the formation of fat and lactic acid, providing material for the maintenance of respiration, and promoting by its oxidation heat in the system, it cannot through its deficiency of nitrogen alone support life. It is the basis of the various preparations known as confectionery; and it is a valuable material for preserving fruits, meat, and fish, and is largely used especially for the saccharine confections known as preserves and sweetmeats, and in curing hams. (See Preservation of Food.) It is a prevailing opinion that sugar is injurious to the teeth; but it is found to have no action upon them out of the body, and if it affects them in the system it is probably by its first disordering the digestive organs, when taken in excessive quantities. Molasses has an aperient action, and sugar has the same also in less degree; but their more important medicinal property is that of a demulcent, for which they are much used in catarrhal affections. In pharmacy sugar is employed for a variety of purposes, especially as a medium for administering many active medicines and disguising their disagreeable taste, or preserving them from change. It forms the bulk of most of the sirups and confections, and of all the troches or lozenges. Molasses is useful in the preparation of many pills, keeping them soft and moist, while at the same time preventing mouldiness or other change. Sugars are rarely adulterated to any injurious extent, and there are few substances that could be added to the white sugars and not be readily detected by their insolubility in water, their leaving an ash when consumed, or their imparting a peculiar taste to the mixture. Starch and starch sugar have been used for this purpose. The brown sugars met with in the London market are so impure, in consequence chiefly of the defective methods employed in their manufacture, that they have been pronounced by Dr. Hassall in general unfit for human consumption. The exceptions are some large-grained, clear, dry, crystalline sugars, evidently made from juice purified by filtration before boiling. The brown sugars almost universally contain minute fragments of cane, sporules and filaments of fungus, grape sugar, molasses, and great numbers of the sugar mite (*acarus sacchari*), a disgusting insect large enough to be seen by the naked eye. When a quantity of sugar containing them is dissolved in a wine glass of tepid water, and left at rest an hour or so, the animalcules are seen on the sides of the glass, upon the surface of the mixture, and in the sediment at the bottom. In England it is the custom with the grocers to "handle" the sugars, which means mixing sugars of different qualities, and thus disguising the worst sorts. The purest large-grained brown sugars are scarcely sold at retail, and their introduction is discouraged by the grocers, because, as stated by Dr. Scoffern, they are incorporated with difficulty among the inferior sugars, and betray to the eye the mixing practice.—*Manufacture.* This may be regarded as commencing with the cultivation of the cane. This plant (*arundo saccharifera*) belongs to the natural order of *gramineæ* or grasses. It grows in a succession of joints, or rather nodes, from 4 to 20 feet high, and the stem is 1 to 2 inches in diameter. Long slender leaves shoot forth from the opposite sides of alternate joints, and fall off when the plant comes to maturity. From the top there appears, when the plant is 11 or 12 months old, a sprout called the arrow, which grows to the length of 7 or 8 feet without joints, terminating in an ample panicle about 2 feet long with numerous white flowers. Seeds are rarely produced by the cultivated canes, and it is stated that the plant is nowhere raised from these, but always from the cuttings of the stalks. The stem is smooth and straight, the joints 3 to 6 inches apart, and the outer coating hard and silicious, and when ripe of various shades of yellowish, violet, greenish, and red. Between the joints the cane is filled with a whitish spongy tissue, which under the magnifying glass is seen to consist of numberless cells containing the saccharine juice. The principal varieties of the cane are the creole, also known as the crystalline, and Malabar; the Otaheite, and the ribbon or Batavian. The first, which was formerly cultivated in Louisiana as the most valuable variety, has there run out, and has given place to hardy varieties of the ribbon cane from Java, which have also greatly deteriorated, as affirmed, through an injudicious system of culture. The creole and Otaheite are cultivated in the West Indies and in South America. The latter variety is highly esteemed, and in Jamaica it is said to grow the first year 12 to 14 feet high, with stems 6 inches in circumference, and joints 6 inches apart. In the East Indies a number of other varieties of cane are cultivated, among the most productive of which is the Salangore cane, grown in the straits of Singapore, which have produced at the rate of 7,200 lbs. of undrained sugar to the acre, equal to 5,800 lbs. of dry sugar for shipping. The method of planting varies in different countries; but in general the practice is, after breaking up the land, to run straight parallel furrows through the plantation at distances 4 to 6 feet apart in the West Indies, or 8 feet in Louisiana, in which furrows slips of the cane, each having several joints, are placed, 2 to 5 feet apart, and lightly covered. In Louisiana some planters lay 2 to 4 canes in each furrow, lapping the same the whole length. The spaces between the rows are kept well ploughed or hoed. In the West Indies the best season for planting is from August to November; the cutting may be in March and April, but is often performed at any convenient time during the year. In the southern states, where the ground is liable to be frozen, the plants are usually put in between January and March, and the crop is gathered in October. The slips for seed are then selected, and, though it would be true economy to reserve the best canes for this purpose, the planters are generally unwilling to do it, and hence one cause of the deterioration alluded to above. Were the planting done every year, this would be a much more serious consideration than it is at present, the canes growing upon an acre being not more than enough to plant 4 or 5 acres; but after the removal of the canes new shoots spring up from the stubble, and these, known as ratoons, though not as large and vigorous as the "plant canes," afford better juice, which is more readily converted into sugar. In Louisiana a succession of only 3 crops can be depended on from one planting; while in the West Indies the ratoons continue to renew themselves sometimes for more than 20 crops. About $\frac{1}{12}$ of the product therefore, it is seen, must be reserved in Louisiana for seed. The yield of sugar in the southern states is from 500 to 2,000 lbs. to the acre; in the West Indies 3,000 to 5,000 lbs.; and in the East Indies the highest product is about 7,000 lbs. In Mauritius the product is said to have been increased from 2,000 or 2,500 lbs. to the acre to 6,000 and 7,000 lbs., and in some cases even more than this. At maturity the canes are cut off close to the ground, and are stripped of the tops and leaves, which, under the name of trash, are left upon the ground, to protect, in this country, the roots from frost during the winter. The practice is to consume this sooner or later by fire, though some of the southern planters strongly recommend its being ploughed under in the spaces between the rows. The canes contain most sugar in the lower third of their length; the juice in the tops is watery and not worth saving. Cattle, horses, and mules are fond of all parts of the plant, and the tops and leaves when fresh make for them good fodder. As soon as the canes are cut they should be taken to the mill and ground, as they are liable to soon ferment in the warm climate, and thus lose a portion of their sugar. They are found to contain when analyzed from 66 to 78 per cent. of water, 12 to 21 per cent. of sugar with a very small quantity of other soluble substances, and 9 to 17 per cent. of ligneous fibre. But owing to the imperfections of the manufacture, it is supposed that not ⅓ of the sugar in the cane is saved, the product not really exceeding that obtained by the French manufacturers from the beet root, which contains an average of only about 11 per cent. of sugar. The mills employed for crushing the canes are of a great variety, and those in use from ancient times in the East Indies are exceedingly rude, and slow and inefficient in their action, worked by oxen. Mills not much better are still employed by small planters in the West Indies; but powerful machines driven by steam are in operation upon the more important sugar estates, the crushing apparatus consisting of 3 heavy cast iron rollers, between which the canes are passed. They revolve horizontally, one called the top roller over the two others, one of which is the fluted feed roller and the other the delivering roller. The canes are spread upon a cast iron feed plate sloping down to the upper edge of the feed roller, and are drawn into the space, usually of about ½ an inch, between this and the top roller, and are discharged through the space of about ⅛ of an inch between the top roller and the delivering roller. Very efficient machines are also in use with 2 rollers above and 2 below. After passing once through, the crushed canes, now called bagasse, or in English works megass, are returned to the feed plate either by hand or by the mechanical contrivance called the dumb returner, and are again compressed. About ⅔ of the whole juice is thus extracted, and runs down into the troughs or receptacles placed beneath to collect it. The remainder is obstinately held by the bagasse, and no effectual means of recovering it has yet been devised. A method which has been favorably spoken of, some time since patented in England by Mr. Michiel, and called the maceration process, entirely dispenses with the mill. It consists in cutting the canes into extremely thin slices with circular knives, and then submitting them to the action of a mixture of lime and water. The lime is supposed to coagulate and render insoluble all the nitrogenous matters, and the whole of the sugar to be taken up by the water. On an estate in the island of Martinique the adoption of this process is reported to have increased the yield of the cane from 5 or 6 per cent., which it previously was, to 11 or 12 per cent. The difficulties attending its use are the rapid wear upon the knives and the time and labor required in their use over that in grinding. The bagasse, consisting largely of carbonaceous matters, burns freely, and is advantageously used as fuel in the boiling operation. The following are results of some of the analyses of its ash made by Dr. Stenhouse; Nos. 1 and 2, of cane of Trinidad; No. 3, of cane of Berbice; and No. 4, of cane of Demerara:

Constituents.	1.	2.	3.	4.
Silica	46.46	41.87	50.00	17.64
Phosphoric acid	8.23	4.59	6.56	7.87
Sulphuric acid	4.65	10.98	6.40	7.97
Lime	8.91	9.11	5.09	2.84
Magnesia	4.50	6.92	13.01	3.93
Potash	10.63	15.99	13.69	32.93
Soda	..	..	1.33	..
Chloride of potassium	7.41	8.96	..	10.70
Chloride of sodium	9.21	2.18	3.92	17.12
Total	100.00	100.00	100.00	100.00

The capacity of the mills should be about 100 gallons of juice an hour for each horse power. The crude liquor contains various impurities, as particles of woody fibre, coloring matter, different soluble salts, albumen, caseine, wax, &c. The nitrogenous substances induce immediate fermentation and the conversion of a portion of the sirup into alcohol and afterward into acetic acid, thus not only reducing the product of sugar, but introducing new compounds, which might prove detrimental by acting upon the lead and copper of the apparatus and adding their poisonous salts to the sugar. Not much time should therefore be allowed for a portion of the impurities to settle before the liquor is drawn through the strainers of copper or iron wire into the vessels for clarifying it. By the old method practised in Asia a series of 11 kettles or earthen boilers is set in a line in a rudely constructed boiler range, at one end of which is the fire, with a large iron boiler placed over it, and at the other the chimney. The juice is first put in the boiler furthest from the fire, and is gradually transferred to the others, as the process goes on, until the final concentration is effected in the iron boiler. The product is afterward drained and the sugar is clarified by boiling again with water, an alkaline lye, and milk. A somewhat similar arrangement of kettles, to the number of 4, 5, or 6, has also been employed in this country and the West Indies, each kettle, however, having its own fire, and the defecation or partial purifying being effected during the boiling by "tempering" the liquor with slaked lime. This, when used in small quantity, causes the glutinous matters present to coagulate and rise upon the surface in a scum, which may be continually removed by skimming. It also neutralizes any acid that may have formed. In Louisiana it has been the practice to concentrate the sirup to 42° Baumé in the last kettle, called the battery, and then transfer it to large wooden vats, called coolers, for granulation; but the operations have been variously modified there, and different methods too have been pursued in the West Indies. Instead of kettles, each one requiring a separate fire, large copper caldrons or "teaches" are used, into which the juice is conducted from the strainers in troughs lined with lead; and these caldrons are heated by steam either by being enclosed in a steam jacket or by containing a coil of steam pipe. The clarification is effected as before by means of lime added to the sirup diffused through a portion of juice, or in the form of milk of lime of known strength and carefully graduated, so that exact quantities may be used. Just enough should be used to neutralize exactly the sirup, which may be known when litmus paper indicates neither an acid nor alkaline reaction. An excess of lime should be particularly guarded against, as it involves a loss of sugar; and when it occurs the effect should be corrected by careful addition of alum, or better of sulphate of alumina, which contains no potash. The heat employed in clarifying should not reach the boiling point of the sirup. At a less degree a scum gathers upon the surface, and when this rises in large bubbles and breaks up into white froth, the clarification is completed. The heat is then stopped, and the liquor is left to repose for an hour, when it is drawn away from the scum, and is seen as it flows into the first of the evaporating pans to be of a clear bright wine yellow color. These pans, to the number of 3 or more, are set in succession over a flue heated by a fire at one end. The liquor is gradually transferred to the smaller pans, and as it boils away the scum that rises is taken off. It is the skimmings in these operations that furnish the best materials for distillation, and the manufacture of rum is very generally carried on in connection with that of sugar. In the smallest and last pan, to which sometimes the term "teache" is exclusively applied, the sirup is finally collected; and when it is judged to be sufficiently concentrated for granulating, it is transferred, or as it is called "skipped," into the coolers, and thence into the vessels, also called coolers, in which the granulating takes place. These are of wood with thick sides, about 7 feet in length, 5 or 6 in width, and not less than a foot deep. This depth and the thick sides are requisite to secure slow cooling, without which the grains could not be coarse. In about 24 hours the graining takes place, the crystals forming a soft mass in the midst of the liquid portion or molasses. The separation of the two products is effected by drainage in what is called the curing house. This is a large building covering an open reservoir in the centre. Frames are provided for hogsheads so that the drippings from these shall flow into the reservoir. In the bottom of each hogshead several holes are bored, and into each hole is put a crushed cane or the stalk of a plantain leaf, the lower end projecting several inches below the bottom. The hogsheads being filled with the soft sugary mixture, the molasses gradually drains away from it, dripping from the stalks. The operation goes on for 8 to 6 weeks, till the sugar is considered sufficiently dry for shipping. It still, however, retains considerable molasses, and in the moist hold of the ship the separation continues to take place, the molasses leaking away and involving a serious loss. Of the sugars formerly shipped from St. Domingo to France the proportion thus wasted was estimated at ⅓. It is this variety of sugar that is known in commerce as muscovado.—Various improvements have been introduced in the manufacture as described, most of which originated with the French chemists, in their attempts to perfect the beet sugar manufacture. Such are the methods of filtering the juice after it leaves the clarifiers, either by means of fine copper wire sieves, of flannel bag filters, or of the cylinders filled with coarsely pulverized bone black or animal charcoal, invented by Dumont. The object of this last is to remove the coloring matter from the juice, and all mineral salts that may have been in it originally, or any excess of lime. The bone black is used in a large iron or copper vessel 6 to 12 feet high, furnished with a perforated bottom, which is covered with a filtering cloth, upon which is placed the charcoal. Five tons of this suffice for 100 tons of sugar; after which the charcoal itself requires to be purified, which, after the sugar it retains has been washed out, is usually effected by recalcination. An ingenious and economical mode has been devised where steam heat is used of concentrating the juice from the filters before evaporating. The pipes conveying the waste steam are arranged in a rack or coil, like the hot air pipes for warming rooms, and the juice is made to trickle over these, the effect of which is that it is greatly concentrated by evaporation before it flows away in the pipe in which it is collected at the bottom of the apparatus. The steam in the pipes is condensed by loss of latent heat, and the lower pipes are so much cooled that no danger is incurred of their burning the sirup, which in its denser condition is more liable to be thus injured. Where this expedient is adopted, the vacuum pan is employed for evaporating, and it is the waste steam from this that is made use of. This very important apparatus was invented by Howard in England in 1812, and has been applied rather in the subsequent refining of sugars than in the preparation of the crude article. Its object is to facilitate evaporation and render it practicable at so low temperatures that all risk of burning the vegetable juices, or medicinal extracts when used in the preparation of these, may be avoided. As used in the sugar manufacture, it is a large flattened spheroidal vessel of copper, sometimes 8 feet in diameter, made in 2 parts, a pan beneath surmounted with a dome-shaped cover, secured together by bolts through their flanges. The pan is surrounded with a cast iron steam jacket, and a coil of steam pipe is laid round it inside, by which heat is supplied for boiling the juice. The steam produced in the vacuum pan by the evaporation of the juice is taken off by the condensing apparatus described above, or where this one is not required, then by a special condenser. The effect of either is to produce a partial vacuum in the pan, diminishing the pressure upon the surface of the liquid and facilitating its evaporation. An air pump is also provided for the purpose of exhausting when necessary the air in the machine and the water that condenses in the pipes. The large pans are furnished with various appendages, as an overflow side vessel connected with the dome by a large pipe, and serving to catch any sirup that boils over; a man-hole cover of gun metal at the top; a thermometer for indicating the temperature of the sirup; a barometer for marking the pressure within; a measure with pipes and cocks holding about 85 gallons, into which the juice is first passed before it is admitted into the pan; a piston so arranged with a proof stick that a sample of the contents may be extracted for examination without letting air into the pan; a similar contrivance by which a piece of butter may be introduced for the purpose of checking too violent boiling; an apparatus in the bottom for letting out the sugar as desired; glasses inserted in the dome, one on each side, for observation of the condition of the contents; beside the various apparatus connected with the supply of steam and regulation of its pressure. In using the machine, enough of the sirup is run in to cover the heating surface of the pan; the steam is then turned on, and the heat kept at 180° to 190° F. till granulation begins to take place; it is then lowered to 160° and finally to 145°, which is the lowest point at which proof sugar boils at 3 inches below a perfect vacuum, or at a pressure equivalent to 27 inches of mercury, 80 inches marking a perfect vacuum. When the first measure is sufficiently granulated, the sugar is not withdrawn, but another similar charge of sirup is added, and so the operation is renewed to the full capacity of the pan. This method has the effect of giving increased coarseness to the crystals, which more readily form upon those already produced. The sirup filled with crystalline sugar is finally let down into a large copper pan beneath it, called the heater, in which the temperature is raised to 180°, while the sirup is stirred with paddles to promote granulation. The sugar is then transferred into conical-shaped moulds, in the small end of which is a hole temporarily plugged; and these are left several hours for the sugar to solidify. The plugs are then removed, and the moulds of sheet iron or unglazed earthenware are kept at a temperature of about 100°, while the uncrystallized sirup drains through into vessels placed to collect it. While in this state, the operation called claying is performed, a practice very generally followed in the West India islands. A layer of whitish clay thoroughly mixed with water is laid upon the surface of the sugar, and left until the water has passed down into the sugar. As it goes through, it carries the remaining sirup along with it; and when the clay is left dry this is renewed by a fresh layer. The method termed "liquoring," which is pouring a saturated saccharine solution upon the sugar, is practised in the sugar refineries, and will be noticed in treating of them. The drainings from the moulds are reboiled with raw sugar or with the refuse of the sugar house to produce inferior sorts of sugar. The sugar when taken from the moulds is in solid loaves, more or less white according to the manner in which the process has been conducted. Discolored portions on the exterior are removed by dressing the loaves, after which they are finally dried at a temperature of 130° to 140°. Sugar equal to the best refined might thus be obtained direct from the canes by the same process as that in use for refining the impure sorts. The use of the improved machinery has already resulted in largely diminishing the waste and improving the quality of a considerable portion of the sugars shipped from the West Indies, South America, &c.—*Sugar Refining.* The preparation of the purest varieties of sugar did not originate in the sugar-producing countries, but the art was applied first by the Venetians to the crude sugars brought from Egypt. It was practised in Antwerp in the 16th century, and was thence introduced into England. At present it is an important branch of manufacture in most of the principal commercial cities of the United States and of Europe, and will doubtless long continue to be so, as the various processes connected with it are carried on to better advantage in manufacturing communities than in districts of a purely agricultural character. As formerly practised, raw sugar was dissolved with lime water in a large open boiler, and, when warm, bullock's blood was added, which as it coagulated on boiling collected most of the lighter impurities and carried them up to the surface in the form of a thick scum. This being removed, the liquor was partially evaporated by boiling, filtered through woollen cloth, then concentrated and grained on the general plan already described. The present operations are conducted in large buildings 6 or 7 stories high, which afford facilities for letting the product down from one to another in the different stages of the operation. The raw sugar, in the first place, is discharged upon the open floor, and the hogsheads and boxes are cleared of the sugar which adheres to them by placing them inverted over a steam pipe and directing a jet of steam over the inside. The dissolved sugar flows down into the dissolving pan in which the whole is collected. The pan is sometimes called a blow-up cistern, from the practice of blowing in steam to hasten the solution. This is also effected by hot water and the use of an agitator kept in action by the steam engine. The liquid is raised to the temperature of 165° F., and its strength is brought to about 29° Baumé. If acid, the solution is rendered neutral by adding lime. Some manufacturers introduce blood at this stage, and after the addition the solution is boiled. In case the raw sugar was not at first hoisted to the upper floor of the building, the liquor is now raised to it by pumping, where it is first filtered through long bags of twilled cotton, strengthened by outer ones of strong linen. The liquor runs away from them resembling in color dark sherry wine. The color is removed by passing the solution through filtering beds of granulated animal charcoal (see BONE BLACK), which, in pieces as large as peas, is contained in cylinders of cast or wrought iron of 5 to 10 feet diameter and from 10 to 50 feet high. The quantity of bone black required varies in different establishments from 1 to 4 tons to 100 of sugar. When the liquor ceases to run clear through the charcoal, a new filter is used, the sugar remaining in the old one is washed out with hot water, and the charcoal is removed to be recalcined, as before mentioned. Each time that the bone black is burned it deteriorates in quality, and finally becomes worthless. As the first cost of the article is about 8 cents a pound, its use is one of the heavy items of cost in the sugar manufacture; and it is said that one of the chief difficulties attending the refining of sugar in the sugar-growing countries is the inability to always obtain a good article of bone black. The sugar is now ready for the vacuum pan and the graining process. In the heater it is kept at a temperature of about 170° and is strongly agitated, which has the effect of promoting the whiteness and fineness so desirable in refined sugar. Transferred to the conical moulds, it is again well stirred, to cause the air to escape, which would otherwise render the sugar too porous. After the drainage is completed, some colored sirup is still mechanically held in the sugar. The process of liquoring, before referred to, is designed to remove this, and consists in pouring upon the sugar in the moulds a strong saccharine solution, obtained by dissolving the outer portions removed from previous loaves dissolved in water, and decolored by passing through charcoal; this is continued till the drippings come away clear. An air pump is sometimes applied at the bottom to hasten the process by exhaustion. The loaves taken from the moulds are finally dried, and dressed by turning off their outer portions in a lathe. The sirup boiled down again in the vacuum pan affords more crystallized sugar, which, as well as some prepared from raw sugar of inferior quality, and transferred directly from the vacuum pan to the moulds, sometimes dispensing with the liquoring, is termed crushed sugar. The best products of the refinery are the hard white loaves, containing the greatest amount of saccharine matter, though in this the sugar does not differ materially from the crushed variety. It is a common mistake to suppose that the crude sugars are the sweetest, which no doubt arises from the fact that these possess a more decided taste, which is derived from their impurities and is confounded with the sweetness of sugar.—Inferior sorts of sugar are made from molasses, which yields about 4 lbs. to the gallon. In the United States a few refineries are specially devoted to this manufacture. Molasses, being an incidental product, is of little value in the sugar countries, and is obtainable in unlimited quantities; and an inferior or damaged article fit for this application may often be cheaply purchased in the large markets. The process is similar to that of the other sugar refineries. As the manufacture of raw sugar has been improved upon the plantations, and the molasses consequently produced less rich in crystallizable sugar, this manufacture is not as profitable as it was formerly. —Among the modifications of the sugar refining process in use in different establishments worthy of notice are: 1, the chemical method of refining, originally practised by Prof. Daniell and afterward by Dr. Scoffern; and 2, the method of separating the molasses from the sugar by centrifugal action. The first consists in the use of a solution of basic acetate of lead for precipitating the coloring and foreign matters in the saccharine juice. The excess of lead is rendered insoluble by sulphurous acid gas, and the excess of this gas is removed by boiling. This renders the use of animal charcoal unnecessary, but the treatment of the juice with a poisonous salt of lead should only be intrusted to persons of chemical skill. The centrifugal machine used instead of the draining moulds consists of a drum of wire gauze attached to a central shaft which can be made to revolve rapidly, the whole enclosed in an outer casing of iron. The sugar prepared for the purpose is put into this cylinder and rapidly swept round, causing the molasses to escape through the meshes.—*Beet Root Sugar*. The beets cultivated in preference to other sorts in Europe for the manufacture of sugar are varieties of the white Silesian, yielding a juice richer in sugar and more free from salts than that of other kinds of beet. The weight of the larger ones is about 5 lbs. each; and the yield per acre in France and Belgium is 14 or 15 tons, and about Magdeburg 10 to 12 tons of beets richer in sugar. The crop is a successful one over most of Europe, but more particularly N. of lat. 45°, and upon light dry soils, in a dry atmosphere. The richness of the juice is injured by direct application of manures to the growing crop, and it is less in large beets than in small ones. When the leaves begin to die, the beets are dug, the heads cut off, and the roots are thrown together and covered to protect them from light and frost. They may be thus kept for some time, though there is always risk of portions of the sugar passing into the uncrystallizable variety. The proportion of sugar contained in the fresh root varies from 5 to 12 per cent., and the product in a large way is usually about 6 per cent., sometimes 7½. The other contents of the root are: water, 83 to 94 per cent.; ligneous fibre and albumen, 2.5 to 5 per cent.; together with a small proportion of what is supposed to be pectine, and a trace of mineral substances. Taken to the factory, the beets are first washed clean in a cage revolving on a horizontal axis, and partly immersed in water; and when washed they are discharged by the action of the machine itself. As the juice cannot be forced out from the cells by compression alone, it is found necessary to tear open the cellular tissue, and this is done by a grating machine of the form of a rotating drum, the inner surface of which is studded with teeth. The pulp is then subjected to powerful hydraulic pressure. Maceration has also been employed to separate the juice. For this purpose the beets are cut into thin slices and put into a cistern with about their own bulk of hot water. In half an hour the liquor is let down upon other slices in another cistern, and so on through 3 to 5 vessels, until it acquires a density of 5½ to 7° B. By this process the juice is rendered very weak, apt to ferment, and requires much fuel to concentrate it. Another method practised near Heidelberg is, as soon as the beets are gathered and washed, to cut them into small rectangular pieces and dry them upon floors. Their bulk is thus reduced about 84 per cent., leaving 16 of dry matter, which may be kept for any time and transported to any distance. The sugar is then extracted by infusion or by maceration through a long series of vessels. The factory where this operation is carried on at Waghäusel is of immense extent, the buildings covering 12 acres of land; and in 1855 it employed 3,000 people. The infusing vessels, 20 in number, are 12 to 14 feet deep and 7 wide. The beets cost only 7*d.* per cwt., and when dried produce about 46 per cent. of sugar. The capital invested was 80,000,000 francs. The juice, however obtained, is rendered alkaline by the addition of lime water, and is then boiled. Excess of lime is removed by converting it into a sulphate, by the addition of ammonia alum, and the alumina set free aids the clarification. Another method is to pass a current of carbonic acid gas from an enclosed coke fire through the liquid, thus converting the lime into a carbonate. The subsequent processes of filtration, concentration, and granulation are similar to those already described. Various methods of evaporation have been devised in place of the vacuum pan.—*Maple Sugar.* Several species of the maple afford, when the sap begins to flow in the spring, a juice containing crystallizable sugar. That yielding the richest juice is the *acer saccharinum*, the rock or sugar maple. The swamp or river maple, known also as the white or soft maple, produces a juice of inferior quality, but which is sometimes employed in sugar making. (See MAPLE.) The manufacture is stated to have originated in New England about the year 1752. It thence extended throughout the wooded portions of the country where the sugar maple abounds, particularly in the north-eastern states, New York, Michigan, Pennsylvania, and Ohio, and on the range of the Alleghanies further south. It is carried on in Canada both by whites and Indians. The tree is found in groves called sugar orchards, associated with scattering birch and other hard wood varieties, where the soil is good. At the proper season, usually in February and March, when the days begin to grow warm and the nights are frosty, the sugar makers resort to the woods, taking with them the few utensils they require, as large iron kettles, ¾-inch augers, casks, buckets, and axes. They construct rough sheds over the boiling places, and if need be others for their own accommodation. Small open troughs hollowed out of the pine have been already prepared and distributed near the trees. With the augers they bore 2 holes in each tree a few inches apart, about 2 feet above the ground, taking care to penetrate not more than half an inch into the white wood. Into the holes they introduce split pieces of elder, from which the pith is removed to make a channel for the sap to flow; through this it gradually drips and collects in the trough placed below to receive it. The troughs as they fill are taken to the camp, and the juice is poured into casks to be transferred to the kettles. The boiling is actively kept up, and the scum which rises is removed; more sap is added as the liquid evaporates, till a considerable portion is converted into thick sirup, when it is cooled and filtered through woollen cloth. It is then boiled again in a smaller kettle, and when it has attained the proper consistency for granulating it is turned into the moulds, which are commonly made of birch bark. The molasses soon drains away and leaves the sugar perfectly dry and hard, of a dark brown color, and of a peculiar pleasant taste. The juice of the maple is much more free from salts and other ingredients than that of the beet. The sugar is mostly consumed in its raw state, considerable quantities being sold in small cakes and eaten like candy. It may be easily refined and converted into the best white sugar.—*Production.* The total production of sugar has been estimated as follows in tons for the countries and years named: .

CANE SUGAR.

Countries.	1853–'4.	1856–'7.	1858–'9.
Cuba	349,502	369,610	415,000
Porto Rico	40,107	85,660	50,000
Brazil	114,509	125,000	75,000
*United States	224,662	86,908	105,000
West Indies, French.	78,780	106,686	110.000
" " Danish,	10,000	12,212	8,500
" " Dutch.	17,102	19,000	14,000
" " British.	172,215	146,925	180,000
East Indies	40,121	57,822	160,000
Mauritius	101,000	110,000	120,000
Java	74,771	72,911	110,000
Manila	41,908	42,210	60,000
Total cane sugar	1,264,677	1,134,959	1,307,500

BEET SUGAR.

Countries.	1854.	1857.	1859.
France	76,951	88,126	115,000
Belgium	8,760	10,101	17,500
The Zollverein	70,821	87,319	115,000
Russia	17,192	22,208	40,000
Austria	14,211	19,392	70,000
Total beet sugar	187,935	212,646	357,500
Cane sugar	1,264,677	1,134,959	1,307,500
Total of both kinds	1,452,612	1,357,605	1,665,000

Louisiana produces the great bulk of the sugar crop of the United States. It is there a fluctuating crop, and yielded an average from 1822 to 1825 of about 80,000 hogsheads annually. It afterward increased, amounting in 1842–'3 to 140,316 hogsheads, the next year to 100,846, and in 1844–'5 to 204,913. Its further progress is indicated in the table below. The hogshead, when the weight in pounds is not given, is rated at 1,000 lbs. of sugar; it also contains from 40 to 50 gallons of molasses:

Years.	Total crop.		Av. price per hogshead.	Total value.	Exports from New Orleans.	
	Hogsheads.	Pounds.			To Atlantic ports.	To western states.
1845	186,650	186,650,000	$55	$10,265,750	79,000	75,000
1846	140,000	140,000,000	70	9,800,000	45,500	70,000
1847	240,000	240,000,000	40	9,600,000	84,000	115,000
1848	220,000	220,000,000	40	8,800,000	90,000	108,000
1849	247,923	269,769,000	50	12,396,150	90,000	125,000
1850	211,201	231,194,000	60	12,678,180	45,000	123,000
1851	236,547	257,138,000	50	11,827,350	42,000	149,000
1852	321,934	368,129,000	48	15,452,688	82,000	206,000
1853	449,324	495,156,000	35	15,726,340	166,000	185,000
1854	346,635	385,726,000	52	18,025,020	122,000	143,000
1855	231,427	254,569,000	70	16,199,890	89,188	131,027
1856	73,976	81,373,000	110	8,137,360	1,350	39,576
1857	279,697	307,666,700	64	17,900,608	48,885	153,012
1858	362,296	414,796,000	69	24,998,424	98,885	187,889
1859	221,840	255,115,750	82	18,190,880	....	....

* The figures for the United States appear to include the crop of Louisiana alone.

The census returns of 1860 will doubtless show a considerable gain in some of the other states, particularly Texas, over their proportional share of the product of 1850. The census returns for 1850 give the following as the production of the several states named of cane and maple sugar and molasses:

States.	Cane sugar, hhds.	Molasses, galls.	Maple sugar, lbs.
Maine	....	3,167	93,542
New Hampshire	....	9,811	1,298,863
Vermont	....	5,997	6,349,357
Massachusetts	....	4,693	795,525
Rhode Island	....	4	28
Connecticut	....	665	50,796
New York	....	56,539	10,357,484
New Jersey	....	954	2,197
Pennsylvania	....	50,652	2,326,525
Delaware	....	50	....
Maryland	....	1,430	47,740
Virginia	....	40,322	1,227,665
North Carolina	....	704	27,932
South Carolina	671	15,904	200
Georgia	1,642	216,150	50
Florida	2,750	352,893	....
Alabama	8,242	83,428	643
Mississippi	888	18,318	....
Louisiana	226,201	10,931,177	255
Texas	7,351	441,638	....
Arkansas	....	18	9,330
Tennessee	248	7,223	158,557
Kentucky	284	30,079	437,405
Ohio	....	197,308	4,588,209
Michigan	....	19,823	2,439,794
Indiana	....	180,325	2,921,192
Illinois	....	8,354	248,904
Missouri	....	5,636	178,910
Iowa	....	3,162	78,407
Wisconsin	....	9,874	610,976
Minnesota territory	....	....	2,950
New Mexico	....	4,236	....
Total	247,777	12,700,534	34,253,436

The production of molasses from the sorghum has become very large since the introduction of this plant in 1856; and in Ohio in 1861 it is reported to have amounted to 3,000,000 gallons, worth 60 cents a gallon. The production of sugar in Cuba in 1860 was 503,680 tons, made on 1,365 estates, of which 691,917 acres, more than half their whole extent, were devoted to this crop. The importations of foreign sugars into the United States amounted in the first years of the 19th century to from 30,000,000 to 55,000,000 lbs., the average being double what it was in 1790, '91, and '92. In 1808 they amounted to 85,000,000 lbs., but did not reach the same figures again until 1822. In 1831 they first exceeded 100,000,000 lbs. The table below presents the imports and exports of all the sugars and of candy for the years named, collected from the U. S. treasury reports. The large importation of 1857 is a direct result from the short crop of Louisiana of the preceding year. The figures are for the years ending June 30:

Years.	Imports, lbs.	Value.	Exports, lbs.	Value.
1857	776,837,695	$42,763,217	20,070,048	$3,744,881
1858	519,036,256	23,480,528	31,646,834	5,143,659
1859	655,612,431	30,558,861	40,167,410	2,808,160
1860	694,793,443	31,076,517	38,482,101	2,555,757

The next table, from the estimates of the New York "Shipping and Commercial List," presents the actual consumption of cane sugar in the United States for the years named, ending Dec. 31, in tons of 2,240 lbs. each, the exports being deducted from the gross receipts:

Years.	Foreign.	Domestic.	Total.
1852	196,558	118,659	315,217
1853	200,610	172,379	373,989
1854	150,854	234,444	385,298
1855	192,604	185,148	377,752
1856	255,292	123,468	378,760
1857	241,765	39,000	280,765
1858	244,758	143,684	388,492
1859	239,034	192,150	431,184
1860	296,950	118,331	415,281
1861	241,420	122,899	363,319

Average increase for the above 10 years, 1.54 per cent. The consumption of molasses has been estimated as follows:

Years.	Total, galls.	Foreign, galls.
1850	37,019,249	24,806,949
1851	43,948,018	28,238,278
1852	48,257,511	29,417,511
1853	55,536,321	28,576,321
1854	56,493,019	24,437,019
1855	47,266,065	23,533,423
1856	39,606,878	23,014,878
1857	28,508,784	23,266,404
1858	45,169,164	24,795,374
1859	54,260,970	28,298,210
1860	47,318,877	28,724,205

While the importation and exportation are both largely increasing, the introduction of foreign refined sugars is not half so great as it was 20 years since. This branch of home manufacture has been greatly extended in late years, refineries of the largest size being in operation in many of the cities on the seaboard and the large rivers of the West. The business is encouraged by the drawback of duties allowed on refined sugar exported, the product of foreign sugars on which the duties have been paid.—The following works may be referred to for further information in regard to sugar: Evans's "Sugar Planters' Manual" (1847); Wray's "Practical Sugar Planter" (1848); Scoffern's "Manufacture of Sugar in the Colonies" (1849); Leon, "Art of Manufacturing and Refining Sugar" (1850); Kerr's "Cultivation of the Sugar Cane" (1851); Tomlinson's "Cyclopædia of Useful Arts;" and "Statement of the Sugar Crop made in Louisiana" (annual reports), by P. A. Champomier. The manufacture of beet root sugar is described by Dumas in his *Traité de chimie appliquée aux arts*, vol. vi.; by Payen, *Chimie industrielle;* and by Dureau, *De la fabrication du sucre de betterave.*

SUGAR OF LEAD, neutral acetate of lead (PbO, $C_4H_3O_3$, 3Aq), a compound of 1 equivalent of acetic acid, 51; 1 of protoxide of lead, 111.6; and 3 of water, 27 = 189.6. This salt is prepared by dissolving in leaden boilers, with the aid of heat, pure litharge in strong vinegar, until this will take up no more. On cooling, the salt crystallizes in right rhombic prisms, which are sometimes transparent; the crystals generally form a confused mass of minute needles of a yellow tinge. They are purified and whitened by repeated solution and crystallization. The proper proportions of the ingredients are 325 parts of finely ground and sifted oxide of lead, and 575 parts of strong acetic acid of 7° Baumé, which should afford 960 parts of crystallized sugar of lead. The salt is without odor, but possesses a sweetish, astringent, metallic taste, whence its name. It effloresces slightly in the air, and at a temperature above 212° F. it loses its water of crystallization, and is slowly converted into carbonate of lead. It dissolves in alcohol, in quantities of cold water variously stated at from $\frac{1}{10}$ to 4 times its weight, and much less boiling water. The solution is clear if the water is pure and free from carbonic acid. Sugar of lead is largely employed in dyeing and calico printing, being used to prepare with alum the red mordant, acetate of alumina. It is a powerful medicine, largely administered for its astringent and sedative properties. In over doses it is an irritant poison, the immediate effects of which however are sometimes obviated by the vomiting it occasions. It has a powerful effect in checking hæmorrhages, and is exhibited in a variety of diseases attended with irritability of the stomach, ulceration of the intestines, &c. It has proved very efficacious in checking mercurial salivation of long standing. It is commonly administered in pills combined with opium. Sugar of lead is also beneficial in external applications for allaying superficial inflammation. The lotion is sometimes advantageously prepared with the addition of an equal quantity of opium to that of the sugar of lead. The continued use of sugar of lead in small doses sometimes produces the diseases known as lead colic and lead palsy.

SUGAR OF MILK. See MILK, vol. xi. p. 501.

SUHM, PETER FREDERIK VON, a Danish historian, born in Copenhagen, Oct. 18, 1728, died there Sept. 7, 1798. He studied jurisprudence, and received an appointment in 1748 in the supreme court, but declined it. He resided in Drontheim from 1751 to 1765, applying himself to northern history and antiquities. After his return to Copenhagen, he published tales, poems, moral treatises, and elaborate historical works, the most important of which are a history of Denmark (11 vols., Copenhagen, 1782–1812), which extends only to the year 1319; a critical history of ante-Christian Denmark; and works on northern mythology and on the origin and migration of the northern peoples.

SUICIDE. See FELO DE SE.

SUIDAS, a Greek lexicographer, supposed to have lived in the 10th century. Though the work of Suidas is usually called a "Lexicon," it contains articles on geography, biography, and history, under proper names, which are given coördinately with the words of the Greek language. The work is in some respects defective and inaccurate, but of great value in the study of the literary history of antiquity. It contains many extracts from ancient Greek writers, some of whom are lost, and information in relation to them is not elsewhere found. The work appears to have received additions from various hands. The first edition of Suidas was published by Demetrius Chalcondylas (fol., Milan, 1499); the best is that of T. Gaisford (3 vols. fol., Oxford, 1834).

SULIOTES, a people of mixed Arnaout and Greek descent, who formerly dwelt in the southern part of the pashalik of Janina, the ancient Epirus. They derive their origin from a number of families which in the 17th century fled from the tyranny of the Turks and settled in an almost inaccessible valley of the Cassiopeian mountains. In the second half of the 18th century they numbered 560 families, embracing about 10,000 souls, and dwelt in 70 villages, the chief of which was Suli, which gave name to the district. They belonged to the Greek church, and their language was Greek, although they also spoke Albanian; their form of government was democratic. They were divided into about 30 tribes or clans. In war they usually fought as skirmishers, and the head of each clan was its captain, who commanded them in battle, subject to a general officer called polemarch, who was elected by vote. In the war of 1787–'92 between Russia and the Porte, the Suliotes strongly supported the former power, defeated in 1789 the troops sent against them by Ali Pasha of Janina, in 1790 ravaged Acarnania to the Achelous, and afterward invaded Arta and Janina, and aided the corsair Lambro Canzani with men and money. Deserted by the Russians after the peace of 1792, they fought desperately against the troops of Ali Pasha, who was determined to exterminate them, and at first were so successful that he concluded with them a truce which lasted a few years. In May, 1801, he renewed his design of extermination, and after a bloody war succeeded in reducing them, the men being put to the sword in large numbers, and the women throwing themselves into the river rather than fall into the hands of their enemies. A few continued to dwell in their deserted villages, but the great majority of the survivors of the war, numbering about 4,000, in 1803 retired to Parga. This place, through the threats and intrigues of Ali Pasha, they were compelled to leave, and betook themselves to the Ionian islands. When in 1820 Ali Pasha, in revolt against the Porte, was hard pressed by the Turks under Koorshid Pasha, and deserted by the Albanians, he recalled the Suliotes. The tyrant of Janina fell in 1822, but the Suliotes remained true to the cause of Grecian liberty. In spite of the heroic efforts of their leader, Marco Bozzaris, the Suliotes were hemmed in in their inaccessible valley; expeditions sent to their relief failed of success; and at last, Suli being taken, Sept. 4, 1822, the Suliotes willingly accepted the offer of an asylum from the governor of the Ionian islands. About 2,000 were carried in English ships to Cephalonia; the remainder dispersed among the mountains. When Lord Byron went to Greece, he raised and equipped at his own expense a corps of 500 men from this people, for whom he had great admiration.

SULLA. See Sylla.

SULLIVAN, the name of counties in 6 of the United States. I. A S. W. co. of N. H., bounded W. by the Connecticut river, which separates it from Vermont, and drained by the Ashuelot and other streams; area, 570 sq. m.; pop. in 1860, 19,041. The surface is hilly, and in some parts mountainous, and the soil fertile in the valleys. There are several small lakes or ponds. The productions in 1850 were 122,609 bushels of Indian corn, 182,720 of potatoes, 98,003 of oats, 54,038 tons of hay, and 580,875 lbs. of butter. There were 11 woollen and 3 cotton factories, 10 grist mills, 26 saw and planing mills, 16 tanneries, 1 paper mill, 2 newspaper offices, 26 churches, and 5,103 pupils attending public schools. It is traversed by the Sullivan railroad. Capital, Newport. II. A S. E. co. of N. Y., bounded S. E. by the Shawangunk and W. by the Delaware river, which separates it from Pennsylvania, and drained by the Neversink and other streams; area, 890 sq. m.; pop. in 1860, 32,385. The surface is rough and mountainous, and there are several small lakes. The soil is well adapted to grazing, and along the streams is fertile. The productions in 1855 were 109,883 bushels of oats, 102,594 of Indian corn, 75,153 of rye, 65,571 of buckwheat, 103,188 of potatoes, 73,298 of apples, 40,716 tons of hay, and 931,927 lbs. of butter. There were 16 grist mills, 145 saw mills, 39 tanneries, 1 furnace, 3 newspaper offices, 46 churches, and 153 schools. It is intersected by the Erie railroad and the Delaware and Hudson canal. Capital, Monticello. III. A N. E. co. of Penn., drained by the Loyalsock, Muncy, and other creeks; area, 430 sq. m.; pop. in 1860, 5,637. The surface is hilly and well timbered, affording a large quantity of lumber for export. The soil is productive. The Alleghany mountain range traverses the S. part. The productions in 1850 were 21,437 bushels of Indian corn, 11,959 of wheat, 4,719 tons of hay, and 90,250 lbs. of butter. There were 17 saw mills, 5 grist mills, and 46 churches, and in 1860 992 pupils attending public schools. Capital, Laporte. IV. A N. E. co. of Tenn., bordering on Va., and intersected by the Holston river; area, 300 sq. m.; pop. in 1860, 13,553, of whom 1,074 were slaves. The surface is very hilly and well timbered, and the soil fertile. The productions in 1850 were 373,698 bushels of Indian corn, 69,987 of wheat, 162,914 of oats, and 99,299 lbs. of butter. There were 28 churches, and 825 pupils attending public schools. Iron ore and coal are found. It is intersected by the Virginia and East Tennessee railroad. Capital, Blountsville. V. A S. W. co. of Ind., bordering on Ill., from which it is separated by the Wabash river; area, 430 sq. m.; pop. in 1860, 15,063. The surface is generally level, and the soil fertile. The productions in 1850 were 742,136 bushels of Indian corn, 56,725 of wheat, 75,879 of oats, and 3,751 tons of hay. There were 2 newspaper offices, 21 churches, and 2,047 pupils attending public schools. Capital, Sullivan. VI. A N. co. of Mo., drained by Locust creek and other streams; area, 650 sq. m.; pop. in 1860, 9,198, of whom 102 were slaves. A considerable portion of the county consists of prairie land, and the soil is fertile. The productions in 1850 were 176,789 bushels of Indian corn, 11,482 of wheat, 15,974 of oats, 1,201 tons of hay, and 35,648 lbs. of butter. Capital, Milan.

SULLIVAN. I. John, an American general in the revolutionary war, born in Berwick, Me., Feb. 17, 1740, died in Durham, N. H., Jan. 23, 1795. For several years before the revolution Gen. Sullivan practised law with great success in Durham, and from 1772 held a provincial commission as major. In 1774 he was a member of the first general congress, and in December of that year, with John Langdon, led a force against Fort William and Mary, near Portsmouth, took possession of 100 barrels of gunpowder (afterward used at the battle of Bunker hill), 15 cannon, all the small arms, and other stores, and carried them up into the country, concealing a portion of them under the pulpit of the Durham meeting house. This was the first act of armed hostility committed in the colonies. In June, 1775, he was appointed by congress a brigadier-general, and commanded on Winter hill at the siege of Boston. After its evacuation, he was despatched with reënforcements to the northern army in Canada, where, a few days after the death of Gen. Thomas, he took command, and in effecting his retreat from the province displayed great military skill and resolution. Congress having appointed Gates to that department, Sullivan proceeded to Philadelphia, and soon joined the main army under Washington. Commissioned by congress as major-general, he acted under Putnam on Long island, and by a combat of two hours in the woods (Aug. 27, 1776), aided by Stirling's vigorous defence on the right, contributed to the preservation of the American army. He was taken prisoner, but, having been exchanged for Gen. Prescott, was with Washington at Westchester during the autumn. After Gen. Lee's capture, Sullivan took command of his division, and led the right at Trenton on Christmas night, 1776. He did efficient service at Princeton, and during the rest of the season protected the lines at Morristown. On Aug. 22, 1777, he made a descent on Staten island, the entire success of which was prevented by misconstruction of his orders, and which, though rash, was subsequently justified by a court of inquiry and by a vote of congress. He commanded the right wing at the battle of Brandywine, and was fully exonerated by Washington and Lafayette from the charge of being responsible for the defeat that ensued. He defeated the British left at Germantown, driving them two miles; but mistakes on the American left, occasioned by fog, changed a victory into a repulse. In

1778 Sullivan commanded in Rhode Island. After long preparations, every thing was ready for an attack upon the British lines at Newport in August, when, deprived of the expected coöperation of the French fleet under D'Estaing, upon which its success depended, Sullivan was obliged to raise the siege; but at Butts's hill, on the 29th, he repulsed the enemy, and withdrew from the island with slight loss. In 1779, being assigned to the command of an expedition against the Indians of the Six Nations, he laid waste their settlements, and on Aug. 29 inflicted a severe defeat on the Indians under Brant and tories under Sir John Johnson, at Newtown, near the present site of Elmira, in western New York. Gen. Sullivan's health being shattered by fatigue and exposure, he resigned after the termination of this important expedition, for which he received a vote of thanks from congress. In the autumn of 1780 he again took his seat as a member of congress, and was chairman of the committee which aided in suppressing the mutiny of the Pennsylvania troops in 1781. Returning to New Hampshire, he was appointed attorney-general, and thrice elected president of the state. In the troubles of 1786 he saved the state from anarchy by his intrepidity and good management, and in 1788 secured the adoption of the federal constitution. In 1789 he was appointed by Washington federal judge of New Hampshire, which office he held till his death. His life was written by O. W. B. Peabody, in Sparks's "American Biography." II. **George**, LL.D., an American lawyer and statesman, son of the preceding, born in Durham, N. H., in 1774, died in Exeter, N. H., June 14, 1838. He was elected a member of the state legislature in 1805 and 1813, of congress in 1811, and of the state senate in 1814 and 1815; and he was attorney-general of the state from 1805 to 1807, and from 1816 to 1835. He was one of the most distinguished advocates of his time. III. **James**, governor of Massachusetts, brother of Gen. John Sullivan, born at Berwick, Me., April 22, 1744, died in Boston, Dec. 10, 1808. After practising law for some years at Biddeford, Me., he was appointed king's attorney for York co.; but he took an early and decisive part on the side of the colonies at the commencement of the revolutionary struggle. He was a member of the provincial congress of Massachusetts (of which Maine then formed a part) in 1775, and with two others executed a difficult commission to Ticonderoga. In the following year he was appointed a judge of the superior court, and in 1779-'80 was a member of the convention which framed the constitution of the state. In 1783 he was chosen a member of congress; and he was repeatedly elected a representative of Boston (to which place he had removed) in the legislature. In 1787 he was a member of the executive council and judge of probate for Suffolk co., and from 1790 to 1807 was attorney-general of the state; and in the latter year he was elected governor by the republican party, and reëlected in 1808. He was one of the commissioners appointed by President Washington for settling the boundaries between the United States and the British provinces. Governor Sullivan was the projector of the Middlesex canal, which was constructed under the superintendence of his son, John L. Sullivan; and he was the author of several works, mostly on legal or political subjects, including a "History of the District of Maine." IV. **William**, LL.D., son of the preceding, born in Saco, Me., Nov. 12, 1774, died in Boston, Sept. 3, 1839. He was graduated at Harvard college in 1792, studied law, and became a leading practitioner at the Suffolk bar, over whose association he presided for many years. He was constantly a member of one or the other branch of the state legislature. He published numerous addresses, and was the author of "Familiar Letters on Public Characters and Events from 1783 to 1815" (12mo., Boston, 1834); "Historical Causes and Effects, from the Fall of the Roman Empire to the Reformation in 1517" (8vo., Boston, 1838); "The Public Men of the Revolution" (with a biographical sketch by his son, J. T. S. Sullivan, 8vo., Philadelphia, 1847); and of "Historical," "Moral," and "Political" class books. V. **John L.**, an American engineer and inventor, brother of the preceding, born in Saco, Me., April 9, 1777. He was in early life engaged in mercantile business, afterward travelled in Europe, studying the construction of canals in France and England, and in 1804 was appointed agent and engineer of the Middlesex canal. This work, designed to provide a navigable channel between Boston and Concord, N. H., by canal and the improvement of the Merrimac, presented great difficulties, but was successfully and economically completed in 7 years. He next turned his attention to steam navigation, and invented the steam tow-boat, for which he received a patent in 1814, in preference to Robert Fulton, who applied for it at the same time, his priority of discovery being fully sustained. This invention he first tried on the Middlesex canal, and afterward put into practical operation in the rivers of Georgia and South Carolina, Fulton's monopoly preventing its introduction at that time in New York. In 1824 he was appointed by President Monroe associate civil engineer of the board of internal improvements, which post he resigned the next year, after making a report on the practicability of a canal across the Alleghanies. In 1830 he engaged in the regular practice of medicine at New Haven, for which he received a diploma, afterward adopted the homœopathic system, and made several important inventions and discoveries both in medicine and surgery. In 1847 he removed to New York, where he still resides (1862).

SULLIVAN'S ISLAND, an island in the harbor and 6 miles below the city of Charleston, S. C. Many of the wealthy citizens of Charleston have residences here. Fort Moultrie is situated on this island, and is a costly and strong fortification, commanding the approach to the main harbor. (See MOULTRIE, FORT.) On Dec. 26, 1860, after the secession of South Carolina, the fort was evacuated by the U. S. troops under Major Anderson, who retired to Fort Sumter. Fort Moultrie was at once occupied by South Carolina troops, and the state authorities proceeded to erect batteries at different points on the island, the guns of which and of the fort were subsequently used in the attack upon Fort Sumter.

SULLY, MAXIMILIEN DE BÉTHUNE, baron de Rosny, duke of, a French soldier and statesman, born at Rosny, near Mantes, Dec. 13, 1559, died at his country seat of Villebon, Dec. 22, 1641. He belonged to a noble Protestant family, and when 16 years old was introduced to King Henry of Navarre, whom he followed in all his wars, and whose chief adviser he became. When his master, on the death of Henry III., claimed the throne of France, of which he was the lawful heir, Rosny, although himself a thorough Protestant, advised the new king to turn Catholic in order to reconcile the majority of the nation to his cause. Being sent on a secret mission to Queen Elizabeth of England, he succeeded in securing her assistance to Henry IV., to whom he also did good service by his skill as an engineer, being instrumental in taking Dreux in 1593, Laon in 1594, Lafère in 1596, and Amiens in 1597. In 1597 he was appointed superintendent of finance, and became in fact the chief minister of Henry IV., the most important parts of the administration devolving upon him. He commenced with reforming the financial system, which had been deranged by dilapidations and robbery; by strict economy and the rigorous control to which the subordinate officers were subjected, he succeeded not only in meeting the heavy current expenses of the government, but in cancelling the public debt, which amounted to 332,000,000 livres, remitting 20,000,000 of taxes in arrears, alleviating the annual taxation, and gathering a reserve of 17,000,000, which was deposited in the Bastile. Meanwhile he fostered agriculture, made the grain trade free, suppressed tolls and prohibitions, built or improved highways and roads, constructed canals, and gave encouragement to drainage and mining. He was created duke of Sully by the king in 1606, previous to which he had been known by the name of Rosny. Under his administration France was the most prosperous country in Europe when Henry IV. fell under the dagger of Ravaillac. Sully for a while longer retained his post as chief minister; but his severity and rigid principles becoming obnoxious to Maria de' Medici and her advisers, he left the court, resigned most of his offices and dignities, and retired to private life. From Cardinal Richelieu he received in 1634 the title of marshal of France. During his retirement he composed his personal memoirs, which were written down under his supervision by 4 secretaries, and were published under the title of *Sages et royales économies d'état* (fol., 1634; 4 vols. 8vo., 1662; English translation by Mrs. Lenox, reprinted, 4 vols. 12mo., London, 1854).

SULLY, THOMAS, an American painter, born in Horncastle, Lincolnshire, England, in June, 1783. He emigrated to the United States with his parents, who were players, in 1792, and at the age of 15 commenced the study of painting in Charleston, S. C. In 1803 he established himself as a portrait painter in Richmond, Va., and removed a few years later to New York, where he entered upon a lucrative practice. In 1809 he settled in Philadelphia, which has since been his home. His reputation as one of the leading American portrait painters is founded upon numerous works produced in the chief cities of the United States. Among his large works may be mentioned full-length portraits of George Frederic Cooke as Richard the Third, Dr. Benjamin Rush, Commodore Decatur, Thomas Jefferson, and Lafayette. His well known picture of "Washington crossing the Delaware" is now in the possession of the Boston museum. During a visit to England in 1837-'8 he painted a full-length portrait of Queen Victoria, esteemed a very faithful likeness. Mr. Sully has until recently continued actively engaged in the pursuit of his art.

SULPHATE. See SULPHURIC ACID.

SULPHATE OF BARYTA. See BARYTA.

SULPHATE OF COPPER. See BLUE VITRIOL, and COPPER, vol. v. p. 682.

SULPHATE OF IRON. See COPPERAS.

SULPHATE OF LIME. See GYPSUM.

SULPHATE OF MAGNESIA. See EPSOM SALT.

SULPHATE OF MANGANESE, an artificial compound of sulphuric acid and manganese, largely employed by calico printers. It is obtained in solution on lixiviating a mixture of the peroxide of manganese, bituminous coal, and sulphuric acid, which has been made into a paste and calcined at a heat of 400° F. The salt crystallizes in prisms of pale amethyst color, which have an astringent bitter taste and are dissolved in 2½ parts of water. They consist of protoxide of manganese 31.93, sulphuric acid 35.87, and water 32.20.

SULPHATE OF SODA. See GLAUBER'S SALT.

SULPHATE OF ZINC. See ZINC.

SULPHITE. See SULPHUROUS ACID.

SULPHUR (Lat. *sulfur* or *sulphur*), an elementary crystalline substance, of yellow color, inflammable, fusible, volatilizable, brittle, occurring abundantly in a native state in volcanic districts and some other localities, and in combination with the metals forming the common class of ores known as the pyritous and other sulphurets; symbol, S; chemical equivalent, 16. Combined with oxygen, it forms sulphurous and sulphuric acids, the numerous salts of which are known respectively as sulphites and sulphates. In various combinations sulphur is found in vegetable and animal bodies. It was known to the ancient Greeks by the name of *θειον* and other designations indicating its purification by fire. They employed it in medicine, in expiation and lustration, and for various uses in the arts, as for fumigating woollens to render them whiter and softer, and for making matches, purposes for which it is still used.—Native sulphur occurs in amorphous masses in sedimentary formations, sometimes crystallized in transparent octahedrons with a rhombic base; but its crystals artificially made assume other forms. It is also met with in fine powder deposited by sublimation around the mouths of volcanoes; and again in concretionary or stalactitic forms of melted sulphur; and in similar forms, friable and almost white, in deposits left by thermal waters containing sulphuretted hydrogen. In general sulphur is distinguished from all other minerals by its yellow color and adamantine lustre; and if these characteristics are not sufficient, it is recognized by its bluish flame when heated to 450° to 500° F., and peculiar suffocating fumes emitted in burning. When pure it is without taste and emits no odor until heated. It is insoluble in water, but dissolves in oil of turpentine, sulphuret of carbon, fat oils, ether, petroleum, and fused paraffine. It is a non-conductor of electricity, and a bad conductor of heat. By friction it becomes negatively electric. The native sulphur is of hardness 2.3, and specific gravity 2.07. At 239° F. it melts, and when run in moulds into round sticks it forms the brimstone (burnstone) of commerce. The sticks are of less density than the native sulphur, and have so little coherence as sometimes to crackle and fall in pieces from unequal expansion when grasped with a warm hand.—The changes which sulphur undergoes, or the different allotropic states it assumes with different degrees of heat, are very remarkable. When melted and the temperature is raised, its color deepens and the liquid becomes viscid. At nearly 500° it is of a deep brown, and so thick that it will not run out if the vessel containing it is inverted. At higher temperatures it again becomes thin, until it reaches the boiling point, which according to Regnault is at 752° (Dumas, 824°), when it begins to pass off in a deep yellow vapor. If, while it begins to grow thin the second time at about 470°, it be poured into water, it remains even when cold in its plastic condition, having the soft elasticity of the gluten of wheat flour, which it much resembles except in color. In this state it continues for several hours before becoming hard. Hollow shells lined with beautiful crystals of sulphur may be obtained by pouring the melted sulphur while in the first liquid stage into a vessel with sloping sides, and when a crust has formed breaking two holes through it on opposite sides, and pouring the liquid portion out through one of them. When cold, the mass is to be detached from the vessel and sawed in two. If the experiment has been well performed, each half will present a radiating and interlaced mass of brownish yellow needles belonging to the oblique prismatic form, attached at their bases to the outer crust. Exposed to the air, their transparency disappears in a few days, and the crystals losing their coherence crumble into an opaque mass consisting of minute rhombic octahedrons. The specific gravity of the artificial crystals is 1.98.—The native sulphur of commerce is derived chiefly from Sicily, where the most productive mines are those of Villarosa, Santa Catalda, and Terra di Falco. At the Italian exhibition at Florence in 1861, the products of the sulphur mines were very conspicuous. The annual product of all the Italian mines was stated to be 800,000 tons, valued at 30,000,000 francs, being 10 times as great as it was in 1830. Sicily produces the greater portion, and the Romagna 8,000 tons. The product is supposed to be increased one fifth by large furnaces of a new form recently introduced, which reduce the usual loss of sulphur consequent upon the unnecessary conversion of a considerable part of it into sulphurous acid. The sulphur is found among beds of black, bituminous, slaty marl and limestone belonging to the chalk formation, associated with beds of gypsum and rock salt. It occurs in bunches and thin irregular layers, which generally follow the lines of stratification. Their occurrence is usually in the upper members of the chalk, where they are overlaid by the tertiary. The sulphurous strata are sometimes so thick as to be followed by drifts like coal beds, and solid pillars of sulphur are occasionally left as a support for the hanging wall or roof. Other localities of similar character are Conil, near Cadiz, in Spain, Bex in Switzerland, and Cracow in Poland. The crater of Vulcano and the Solfatara near Pozzuoli afford large quantities of sublimed sulphur. In the crater the sulphur collects upon the walls, and in the *débris* with which it is filled. In the bottom the loose materials are explored to the depth of 30 feet, or as low as the temperature will admit. The materials taken out are subjected to distillation, for recovering the sulphur as the sublimation goes on. Fresh supplies are obtained in 25 to 30 years. Almost all volcanoes deposit sulphur, but, though apparently in large quantities, it sometimes proves on examination insufficient to pay for extraction. Another source of sulphur is iron pyrites (the bisulphuret of iron), a common ore in all mining regions. This, which contains 54.5 of sulphur, may be made to yield about 27 per cent.; but there is little inducement to prosecute the manufacture, for the sulphur costs much more than the natural product obtained from Sicily, and is moreover often contaminated with arsenic, sometimes to the amount of 7 per cent., while the impurities of fine Sicilian sulphur are earthy matters only, and do not amount to more than 3 per cent. It is important to know, however, that such resources are at hand for supplying sulphur as the vast repositories of sulphurous ores, and the still greater beds of gypsum (sulphate of lime), which by processes well known might be made to produce this article. The waste residues of many chemical manufactures contain large quantities of sulphur in different combinations, which might add largely to the supply in case of any great increase of its price. Where pyritous copper is prepared upon a large scale for smelting, the sulphur is sometimes saved, either by distilling the ore in close vessels, or by roasting it in the open air in heaps of 2,000 tons or more. Such heaps are formed of fine ore at the bottom, covered with brush, and in the centre is placed a wooden chimney into which air passages from the sides are to open. The ore is piled upon the wood about 8 feet high, and covered with about 12 inches of fine ore. Fire is introduced by dropping live coals down the chimney. In a few days the sulphur begins to ooze forth from the surface of the heap, and collect in little excavations made upon it for its reception. From these it is bailed out and cast into moulds. The operation continues 5 or 6 months, producing about 20 tons of sulphur. A similar method is practised in separating the sulphur from its earthy associates at some of the mines where it is obtained in a native state. The heaps are, however, of comparatively small size and built up on prepared concave bottoms, and the whole is covered with fine earth to prevent the too rapid escape of the fumes. The sulphur as it becomes liquid collects in the bottom, whence it is run out into moulds shaped like large bricks. The residues of the operation, mixed with first products of inferior quality, are afterward distilled in upright pots which serve as retorts, a short wide tube from the upper portion of each pot carrying off the volatilized sulphur through the walls of the furnace into other jars of similar shape. From the bottom of these receivers the melted sulphur flows through short pipes into vessels containing water. The sulphur is further purified by a second distillation from iron retorts which discharge the fumes into chambers of brickwork. Upon the walls of these the sulphur condenses, forming the powder called flowers of sulphur. If the walls become hot, the sulphur melts and is run off into cylindrical wooden moulds, thus becoming roll sulphur or brimstone.—A preparation called milk of sulphur or precipitated sulphur, used chiefly in medicine, is made by boiling ordinary sulphur with slaked lime and water and adding hydrochloric acid, which unites with the lime and precipitates the sulphur. Separated from the liquid it is obtained in finely divided particles, slightly cohering together, of whitish color, faintly tinted with yellowish green. Some manufacturers fraudulently precipitate with sulphuric acid, thus producing a large mixture of sulphate of lime. The presence of this may be suspected from too sparkling a white color, and a grittiness when tried between the teeth, and is exposed if the whole is not volatilized by heat.—The uses of sulphur are numerous. It is largely employed in the manufacture of sulphuric acid, and of vermilion, the artificial sulphuret of mercury. It is one of the three ingredients of gunpowder, and matches are coated with it, that by its ready ignition the fire may be held until by its combustion it is communicated to the wood. In bleaching woollen and silk goods and straw it is ignited in close chambers, which are provided with a ventilating draught of air through them, and is thus converted into sulphurous acid gas. It is used for taking impressions from seals and cameos, and for this purpose it should be kept for some time melted, so that it may assume the appearance of bronze. It is an excellent material for cementing iron posts or bars in stone, being much preferable to lead for this purpose, on account of the latter causing the iron to rust through galvanic action. The flowers of sulphur and milk of sulphur are largely employed for medicinal purposes. As the former often contains sulphurous acid, it should be first freed from this by washing in hot water. Its effects are laxative, diaphoretic, and resolvent. Applied externally in various forms, sulphur is readily absorbed, and when taken internally it is dissolved, and is given off through the pores of the skin, discoloring the blood under the nails, and tarnishing silver carried in the pockets, by superficial conversion of the silver into the sulphuret. It is given internally in some of the forms of asthma and chronic catarrhs and coughs; and in chronic rheumatism it is sometimes very beneficial. Combined with magnesia or bitartrate of potash, it is a safe and useful laxative in piles, habitual constipation, &c. It is a specific for the cure of some cutaneous diseases, especially that form known as *scabies*. For these it is employed both internally and externally, in the latter case sometimes in the form of sulphur ointment, and again as a sulphur bath, in which the person, except the head, is immersed in sulphurous acid gas. The brown viscid sulphur obtained by fusion is stated to be a much more active stimulant to the circulation, lungs, and skin than ordinary sulphur. A compound of 1 part of sulphur and 4 of iodine, produced by melting the two substances together in a glass flask at the temperature of boiling water, and rubbed into an ointment with lard, is an excellent preparation for the treatment of various cutaneous eruptions unattended with inflammation, such as psoriasis, lepra, scald head, &c. The efficacy of many natural medicinal waters is due to the combinations of sulphur they contain. Certain diseases of the vine, hops, &c., are sometimes cured by sprinkling sulphur over them.—Sulphur unites with different bodies, forming a variety of useful compounds, of which only some of the most important will be noticed. Those consisting of sulphur and metallic bodies are described under the heads of the several metals. (See also PYRITES.) Of its compounds with carbon, the most useful is that commonly known as the sulphuret of carbon, or more properly the bisulphide of carbon (CS_2), discovered by Lampadius in 1796. This is a transparent colorless liquid of an intensely disagreeable odor, produced by passing the vapor of sulphur through incandescent charcoal contained in an iron or porcelain tube. The substance is remarkable for its volatility, boiling at 110° F., and evaporating rapidly at ordinary temperatures. It is a powerful solvent of oils and fatty matters, and may be used to extract these and numerous coloring substances from fabrics. It has been largely employed of late as a solvent of India rubber, and is now produced in large quantities for this purpose. It also dissolves phosphorus and sulphur; and its combination with the former has been proposed as a destructive inflammable material in warfare to be introduced into shells. (See Greek Fire, vol. viii. p. 472.) The dichloride of sulphur (S_2Cl), also a fluid body prepared by passing chlorine gas through melted sulphur and redistilled, is also used in the preparation of vulcanized India rubber. (See Caoutchouc, vol. iv. p. 391.) If linseed or rape oil is mixed with $\frac{1}{10}$ its bulk of this liquid, and slightly warmed, a substance is produced precisely resembling India rubber, but quite insoluble in various bodies in which caoutchouc is dissolved. With hydrogen sulphur forms the gaseous body described in Hydrosulphuric Acid. With oxygen sulphur forms 7 acid bodies, of which the most important are the subjects of the two succeeding articles.

SULPHURETTED HYDROGEN. See Hydrosulphuric Acid.

SULPHURIC ACID, a compound of 1 atom of sulphur and 3 of oxygen, SO_3, known in commerce as oil of vitriol. It forms several definite compounds with water, of which the one best known is the monohydrate, SO_3, HO. Some of the characteristic properties of these compounds are presented in the following table:

Compounds.	Chemical equiv.	Fusing point.	Boiling point.	Specific gravity.
Anhydrous, SO_3........	40	65° F.	..	..
Dihydrate, $2SO_3$, HO...	89	95°	..	..
Monohydrate, SO_3, HO.	49	51°	640°	1.842
Bihydrate, SO_3, 2HO...	58	47°	435°	1.780
Terhydrate, SO_3, 3HO..	67	..	345°	1.632

Hydrated or liquid sulphuric acid was known to the alchemists, and its discovery has been ascribed to Basil Valentine, a monk of Erfurt in Saxony, about the middle of the 15th century. It was obtained by distilling copperas or green vitriol in a retort at a red heat, the acid dropping from it in an oily liquid, whence the name, oil of vitriol. He also obtained it by burning sulphur under a bell glass moistened with water—a product he called *oleum sulphuris per campanam*; and he obtained it again under the name of oil of antimony by burning equal parts of sulphur, sulphuret of antimony, and nitre under a bell glass. In the present mode of manufacture, nitre and sulphur are burned together to produce this acid. This method was proposed in 1740 by two French chemists, Lefèvre and Lémery, and adopted by Dr. Ward in his manufactory near London. He employed large globular receivers of glass, each containing a few pounds of water, and arranged with their necks projecting horizontally from the sand bath in which the vessels were placed. The sulphur with $\frac{1}{8}$ its weight of nitre was placed in a shallow dish standing just above the water, and when it was fired by a hot iron the necks of the receivers were closed with wooden stoppers. By repeating the process several times, a strong acid was produced at a less rate per pound than an ounce had previously cost. Lead vessels were substituted for glass by Dr. Roebuck of Birmingham about the year 1746, and since that time there has been no material change in the processes. Platinum stills for concentration were in use in the early part of the present century; and in 1813 Dr. Erick Bollman of Philadelphia (the Danish physician who had attempted with Mr. Huger of South Carolina to release Lafayette from the prison at Olmütz) made one of 700 ounces weight and a capacity of 25 gallons, which continued in use 15 years in the works of Mr. John Harrison. Sulphuric acid was manufactured in Philadelphia by Mr. Harrison previous to 1806, and in 1807 he had a leaden chamber 50 feet long and 18 feet wide and high, capable of making 3,500 carboys of acid annually. The manufacture of this and other chemicals is very extensively carried on in Philadelphia in numerous large establishments. It is also an important branch of manufacture in chemical works in other parts of the country; as in Newark, N. J., Roxbury, Mass., and various other places. —Sulphuric acid is the most important and extensively used in the arts of all the acids; and on account of its superior attraction for bases, it is employed for obtaining almost all the other acids by causing them to separate from their combinations. It is when pure a limpid, colorless, and odorless fluid, highly acrid, and exceedingly corrosive. On the living fibre it acts as a powerful caustic. Its freezing point varies with the strength of the acid, and is several degrees below zero when concentrated. In congealing it crystallizes in 6-sided prisms, terminated by pyramids of 6 sides. Dufrénoy states that in this condition he has held it many minutes in the hand without inconvenience, and has measured its angles with the goniometer, finding them to be exactly 120°. The liquid acid chars most organic substances, absorbing the moisture they contain, for which it has a powerful affinity. So great is this that when exposed in an open saucer, it extracts from the atmosphere $\frac{1}{3}$ its weight in 24 hours, and at least 6 times its weight in a few months. At the same time it becomes dark-colored by the decomposition of organic substances in the dust that falls into it. Hence it is necessary to keep it protected from the air in bottles with glass stoppers. Its affinity for water is sometimes advantageously made use of to aid the evaporation of liquids at low temperature, the two fluids in different vessels being placed under the receiver of an air pump, and a partial vacuum being produced. Water may thus be evaporated so rapidly as to freeze. The same property is also made available in various chemical operations in depriving gases, powders, &c., of moisture. If suddenly mixed with water much heat is given out, and when cool the mixture is found to occupy less space than the two liquids did separately. The greatest increase of heat is noticed when 4 parts by weight of the strongest acid are suddenly mixed with 1 of water, both at about 50° F. The temperature then rises to 300°; but if 4 parts of ice be mixed with 1 of sulphuric acid, a liquid is immediately produced with a temperature 4° below zero. Sulphuric acid is detected in solutions by adding chloride of barium, the acid expelling the chlorine and forming with the barium an insoluble sulphate. Sulphuric acid is a powerfully corrosive poison, acting instantly upon the throat and stomach, and causing intense agony and death. Its effects may be alleviated by immediately swallowing magnesia or chalk mixed with water. Impurities of several sorts are often present in the commercial acid, derived from the substances with which it comes in contact in its manufacture; such are the sulphates of potash and lead, nitrous acid, and arsenic. Sulphate of potash is sometimes purposely introduced to increase the density of the acid. Arsenic is found in acid produced from iron pyrites, and in some of English manufacture from 22 to 35 grains of arsenious acid have been separated in Philadelphia from 20 fluid ounces. The fixed impurities are readily detected and estimated by evaporating a weighed portion of the acid. The quantity of sulphuric acid in 100 parts of solutions is estimated by their specific gravities; and the following table, prepared by Dr. Ure, gives the proportion of dry and hydrated acid in solutions of the densities named, at 60° F.:

Specific gravity.	Dry acid.	Hydrated acid.	Specific gravity.	Dry acid.	Hydrated acid.
1.8460	81.54	100	1.8697	89.14	48
1.8415	79.90	98	1.8580	87.51	46
1.8366	78.28	96	1.8845	85.88	44
1.8288	76.65	94	1.8165	84.25	42
1.8181	75.02	92	1.2999	82.61	40
1.8070	78 89	90	1.2826	80.98	88
1.7901	71.75	88	1 2654	29.85	86
1.7728	70.12	86	1.2490	27.72	84
1.7540	68.49	84	1.2334	26.09	82
1.7815	66.86	82	1.2184	24.46	80
1.7080	65.23	80	1.2082	22.88	28
1.6860	68.60	78	1.1876	21.20	26
1.6624	61.97	76	1.1706	19.57	24
1 6415	60.84	74	1.1549	17.94	22
1.6204	58.71	72	1.1410	16.81	20
1.5975	57.08	70	1.1246	14.68	18
1.5760	55.45	68	1.1090	18.05	16
1.5508	58.82	66	1.0953	11.41	14
1.5290	52.18	64	1.0809	9.78	12
1.5066	50 55	62	1.0682	8.15	10
1.4860	48.92	60	1.0544	6.52	8
1.4660	47.29	58	1.0405	4.89	6
1.4460	45.66	56	1.0268	8.26	4
1.4265	44 08	54	1.0140	1.68	2
1.4078	42.40	52	1.0074	0.815	1
1.8884	40.77	50			

Dr. Dalton prepared a similar table based on the boiling point, which in the strong acid gives a much greater range for a small difference in the percentage. The value may also be tested by neutralizing the acid with a standard alkaline solution. The density test is subject to error from the introduction and solution of foreign substances in the acid. Sulphuric acid has been recognized in a few instances in a native state; but its readiness to combine with bases must prevent its remaining free, except under peculiar circumstances, such as being received upon rocks like granite that are not acted upon by acids, or on others like gypsum already combined to saturation with sulphuric acid. Several instances are cited of its occurrence in caverns near volcanoes; and a river near the volcano of Parace in South America is called Vinegar river from the sour taste of its waters, due to the presence of sulphuric and hydrochloric acids.—The manufacture of sulphuric acid, as it is now carried on upon a large scale, is based upon the process of Dr. Roebuck, already referred to, of burning sulphur and nitre together in the presence of water. When sulphur is burned alone in air or oxygen, each atom of it combines with only 2 atoms of oxygen, forming sulphurous acid. To cause it to take up another atom of oxygen, the intervention of some third substance is necessary. Water alone produces this effect, but very slowly. The addition of a little deutoxide of nitrogen will cause this reaction to go on continuously in vessels supplied with atmospheric air and sulphurous acid. As this gas meets the air, it combines with 2 atoms of oxygen, forming the compound NO_4, as is seen in the red fumes that appear. A white crystalline deposit, formed of this substance, sulphurous acid, and water, is next produced on the walls of the vessel; and by the action of water its composition is suddenly broken up, deutoxide of nitrogen is reproduced by the 2 atoms of oxygen going to 2 atoms of sulphurous acid to convert these into sulphuric acid, and the deutoxide is set free to act again as a carrier of oxygen, and so on. In the large manufacturing operations the receivers are immense chambers of sheet lead supported by an outer framework of wood. This metal is selected as the most convenient material to use that is not acted upon by weak sulphuric acid. Some of the chambers are described as 140 feet long, 24½ wide, and 19½ high; and again 75 feet long, 40 wide, and 40 high; and of other similarly large dimensions; the object of the large size being to economize the proportional consumption of lead to the acid produced. The sheets selected for this use commonly weigh 5 lbs. to the square foot, and the edges are joined together by first scraping them perfectly clean, then laying them together as closely as possible, and melting them till they unite by means of the flame of the oxyhydrogen blowpipe. This is called autogenous soldering. Inside the chambers partitions or diaphragms of lead are made across at intervals, leaving an opening alternately next the roof and floor, so that the vapors may be most thoroughly intermixed as they pass through the succession of compartments thus made. The floor of the chambers is covered 3 or 4 inches deep with water, which is gradually converted into acid in the course of the operation. The stove or furnace in which the sulphur is burned is a separate structure near the chamber with a flue connection; and there is also another small furnace near by provided with a boiler for furnishing steam, which by a late improvement is also discharged into the chamber and is carried along, serving to expedite the process by the thorough intermixture of aqueous vapor and gases and by keeping up the temperature to 100° F. or upward. The nitre is placed with some sulphuric acid in a cast iron pot in the sulphur furnace, elevated a little above the floor upon which this is burned. The fumes of nitrous and nitric acid pass on together with the sulphurous acid vapors, and are soon reduced in the chemical reactions to deutoxide of nitrogen. A draught is produced by a flue at the further extremity of the apparatus, opening into a tall chimney. But before entering this the vapors are made to pass through sulphuric acid contained in a condenser, by which any condensible products are arrested. Deutoxide of nitrogen and the nitrogen of the atmospheric air admitted through the furnace still pass on, and the former would be wholly lost but for the ingenious device of Gay-Lussac by which it is arrested and saved to be afterward returned to the chamber, thus reducing the consumption of nitre by more than one half of what it formerly was. This improvement consists in introducing the gases into a leaden tower filled with fragments of coke, through which a stream of concentrated sulphuric acid is continually trickling. This takes up the nitrous vapors and conveys them to a reservoir, whence the mixture is raised by the pressure of steam upon its surface into a cistern over the front of the first chamber. It is then discharged into the top of a small tower, and trickles down over a succession of sloping shelves, meeting a jet of sulphurous acid gas from the generating furnace, and is thence projected with this gas into the first chamber. This improvement also relieves the neighborhood from the noxious vapors that otherwise fall upon it from the chimney. In some of the French manufactories furnished with this arrangement, it is stated that not more than 3 lbs. of nitre are required to convert 100 lbs. of sulphur into 300 lbs. of acid. When the acid in the bottom of the chamber has attained a density of 1.35, or at most of 1.45, it is drawn off, to be employed for such purposes as acid of this strength is suitable for, or to be concentrated to higher degrees by other processes. If the operation were continued further in the chamber, the acid would absorb and permanently retain much nitrous acid gas. It is conveyed into large rectangular pans of sheet lead, weighing 12 or 14 lbs. to the square foot, the edges of which are turned up so as to give them a depth of 8 or 10 inches. These are placed upon a grating of wrought iron bars, set very near together, over a fireplace, the flue of which is sometimes extended under other pans arranged in successive steps toward the chimney. In these the acid is evaporated by the heat of the flame beneath, and is gradually transferred by siphons from the upper to the lower pans, till in the lowest it has acquired a density of 1.65 to 1.75. To continue the process further in these pans would endanger the melting of their bottoms and the contamination of the acid by its taking up a portion of the lead. The product, known as the brown oil of vitriol, is used to considerable extent by bleachers, calico printers, dyers, &c. To raise it to the strength of concentrated oil of vitriol of commerce, it is necessary to make use of glass retorts or stills of platinum. The glass retorts are used of a much larger size than formerly, holding sometimes 20 gallons at the close of the rectification. They are set each one in an iron pot, the bottom of which is covered with a layer of dry sand. The concentration requires from 12 to 16 hours, and the vapors that distil over toward the last, carrying some acid with them, are condensed, to be returned to the lead pans. The process is known to be complete when the acid becomes clear by the removal of the coloring matter, which is only carried off at the highest point of concentration. The acid is then withdrawn through lead siphons, and is received into the glass 10-gallon carboys covered with straw, in which it is sent to market. Platinum stills are sometimes found to be more economical than glass retorts. They are made in Paris of various sizes, costing sometimes 80,000 francs each, and are used encased in cast iron pots, by which they are protected from direct action of the fire. One of the capacity of 70 to 80 gallons is capable of producing 80 carboys of rectified acid in 12 hours, one operation succeeding another without delay, while a glass retort is only used once in 20 hours. A platinum still may also be counted upon for 2 or 3 years' service, while a glass retort is liable to be broken by a current of air striking it when heated. The head of the still is formed of platinum also, and a platinum tube leads from it to a worm of lead which is kept immersed in water. During the operation the stream of concentrated acid is continually flowing. By a late improvement in the platinum manufacture, that metal is now alloyed with iridium, by which it is obtained in much stiffer sheets than when pure. When in use, the stills afford as the acid begins to boil a very weak distillate, which gradually increases in strength till it attains a density of 1.24, which indicates that the process has been carried to the highest practicable point of concentration. Dr. A. A. Hayes of Boston has adopted a process of crystallizing for the same purpose. Acid of specific gravity 1.76, when cold, is treated while hot in the vessels of lead with a little nitre, which has the effect of oxidizing the organic impurities and rendering the acid clear. Sulphate of ammonia is then added to remove any excess of nitre or nitrous acid present, and the sulphuric acid, being concentrated to specific gravity 1.78 and drawn off into other deep vessels of lead, is cooled down to a temperature of 32°. When the acid is clear it is transferred to shallow lead vessels, in which by means of freezing mixtures it is reduced to the temperature of zero. When about half the bulk has crystallized, the mother liquor in which the impurities are concentrated is drawn off, leaving the pure crystalline acid, which may then be broken up, and, after being washed with pure acid of a former operation, be fused in a glass or porcelain vessel.—Sulphuric acid, as already stated, is also manufactured from iron pyrites. A great impulse was given to this branch of manufacture in England about the year 1835 on the occasion of the king of the Two Sicilies imposing a heavy duty upon the exportation of sulphur; and though this duty was arterward removed, the new processes then introduced were too firmly established to be broken up. In almost all countries pyritous iron and copper are abundant products; but it is rare that the sulphur they contain is saved. Reference has been made in Copper Smelting (vol. v. p. 691) to the enormous quantities of sulphur which are allowed to escape in the processes of reducing the copper ores at Swansea, South Wales. For burning pyrites a much higher heat is required than for burning sulphur, and the kilns employed for this purpose are constructed somewhat like a lime kiln in shape, with sides spreading upward. Some coke is generally mixed with the first charges to insure the ignition of the mass. In the first stage of the process but a limited amount of air is admitted through the small grate beneath, the combustion going on chiefly on the upper surface, where openings are made through the wall for admitting more air; but when the mass has attained a full red heat and the bisulphuret is converted by the loss of half its sulphur into the protosulphuret, the other openings are closed and all the air is passed through the ore to expel the remaining portion of sulphur. By this means the ore is prevented from becoming vitrified, in which condition its sulphur cannot be expelled. Nitrate of soda or of potash is placed in the flues through which the vapors pass, and affords the nitrous gas required. The remainder of the process is the same as that already described. Though the acid thus made almost always contains arsenic from the impurity of the ore, it answers very well the purposes of the manufacturer of soda from common salt, and of hydrochloric acid, which is to be used for making chloride of lime.—The Nordhausen or fuming sulphuric acid is the dihydrate named in the commencement of this article. It is prepared at Nordhausen in Prussian Saxony and near Prague in Bohemia, for purposes requiring oil of vitriol of the highest degree of concentration, as for dissolving indigo in dyeing Saxony blue. One half the quantity answers that would be required of ordinary acid. It is produced from green vitriol derived from the residues after separating from iron pyrites a portion of the sulphur it contains. The vitriol, after being deprived of its water of crystallization by gentle heat, is distilled in small pear-shaped earthen retorts, great numbers of which are arranged in a horizontal position in a long furnace. The heat is gradually raised to an intense degree, and is so continued for several hours. A dark-colored dense fluid is collected in earthenware receivers, and is termed fuming from the white vapor of anhydrous sulphuric acid that escapes when it is exposed to the air. When these fumes disappear, the residue is ordinary oil of vitriol. By distilling the fuming acid in a glass retort, the white fumes of anhydrous sulphuric acid may be collected and condensed in a dry receiver surrounded with ice to a white crystalline body resembling asbestus. While dry this substance possesses no acid properties, and it may be moulded in the hands like wax without injury; but dropped into water it hisses as red-hot iron would do, and forms hydrated sulphuric acid. —Some of the uses of sulphuric acid have already been noticed. It is the acid in the large class of salts known as the sulphates, and is employed in the production of most of those which are artificially prepared, as alum and the sulphates of soda, potash, copper, and zinc. It is an important element in a great variety of chemical manufactures too numerous to be particularly named. In medicine it is sometimes used externally as a caustic, and diluted is administered internally for its tonic, antiseptic, and refrigerant properties. In low typhoid fevers and other inflammatory diseases, it acts to cool the system and restore strength, and in convalescence it excites the appetite and promotes digestion. It checks hæmorrhages and diarrhœas not bilious, and colliquative sweats such as attend hectic fever. It is strongly recommended in choleraic diarrhœa, usually checking the vomiting, purging, and cramps after 3 or 4 doses of half a fluid drachm each, diluted with water, every 15 or 20 minutes. It is preferred to hydrochloric acid in calculous affections; is used in gargles for ulcerated sore throat; and is used internally and externally for many cutaneous diseases. The aromatic preparation called elixir of vitriol is the most agreeable form of administering sulphuric acid. It is a mixture of acid and alcohol with cinnamon and ginger.

SULPHURIC ETHER. See Ether.

SULPHUROUS ACID, a gaseous compound of 1 equivalent of sulphur and 2 of oxygen (SO_2), a natural product sometimes issuing from fissures about volcanoes, and artificially produced whenever sulphur is burned. It is a colorless gas of weak acid properties, a pungent suffocating odor, destructive to animal life, and extinguishing flame. Water takes up of it 40 to 50 times its bulk, and the mixture is gradually converted into sulphuric acid by absorbing oxygen from the air. Its weight compared with air being 2.247, it may be collected in dry bottles by displacement. If the gas as generated is passed through a tube surrounded by a freezing mixture, it is condensed into a transparent colorless liquid of specific gravity 1.42, which boils at 17.6°, and freezes at —105° into a colorless, transparent, crystalline solid. The liquid at common temperatures produces intense cold by its rapid evaporation. Sulphurous acid is a powerful deoxidizer, and is employed in chemical researches as a reagent for reducing various oxides to lower degrees of oxidation. The most important use of the acid in the arts is for the manufacture of sulphuric acid, as described in the preceding article. It is also largely employed for bleaching, especially straw hats and bonnets and articles of wool and silk. The goods are moistened with water and suspended in close chambers, in which the gas is produced by burning sulphur in open vessels. As it is absorbed by the goods, the colors disappear, but not through decomposition of the coloring matter as in the use of chlorine; for if the sulphurous acid be expelled by a stronger acid or neutralized by an alkali, the color may reappear. This is the case with new flannels when washed with soap. Sulphurous acid is also used for fumigating rooms, and as a bath in some cutaneous diseases. Its solution in water, from its property of arresting acetic fermentation, is used to rinse out beer barrels.—Sulphurous acid is prepared in a pure state by abstracting one atom of oxygen from sulphuric acid, which is done by boiling concentrated sulphuric acid with copper or mercury. The gas evolved is passed through a small quantity of water to free it from sulphuric acid, and then through a tube containing chloride of calcium to render it perfectly dry. It may be collected over mercury, or in dry open bottles. Charcoal or any dry woody fibre may be substituted for the copper or mercury; but the acid will in this case be mixed with carbonic acid, which however will not interfere with its use in the manufacture of alkaline sulphites.—Sulphurous acid unites with bases to form salts called sulphites; these are of little importance, excepting the sulphite of soda. (See Soda, vol. xiv. p. 769.) A mixed sulphite of lime and magnesia is manufactured to some extent to be used as a disinfectant; and the bisulphite of lime is employed in the manufacture of beet root sugar to prevent fermentation, and to decolor the juice or prevent its acquiring a color.

SULPICIANS, or Priests of the Mission of St. Sulpice, a congregation of priests in the Roman Catholic church, founded in 1641 by Jean Jacques Olier, for the purpose of educating pious priests. When in 1642 Olier became pastor of the parish of St. Sulpice in Paris, his associates followed him and assisted him in the administration of his parish. Soon they became numerous, and were divided into two bodies, the one continuing to assist the pastor and living in common with him, the other taking the direction of a seminary which was established in an adjacent house. The seminary soon became so prosperous that the Sulpicians were called to a number of other dioceses, to take charge of the episcopal seminaries. At the time of the French revolution, they conducted in France 15 diocesan seminaries and 12 *petits séminaires* (preparatory schools), beside the 5 seminaries which they had in Paris. They had also one seminary at Montreal in Canada, and in 1789 founded one at Baltimore. During the revolution all their French houses perished; but by a decree of 1816 the congregation was restored, and soon resumed the control of a number of seminaries. In 1860 they conducted 19 seminaries in France and 2 in North America (Baltimore and Montreal), and numbered in all about 200 priests. Many of the members of this congregation, as the founder Olier, J. A. Emery, and Carrière, are counted among the greatest theologians of France.

SULPICIUS SEVERUS, a Roman ecclesiastical writer, born in Aquitania about A. D. 363, died in a monastery at Marseilles between 410 and 429. He was from a family of high rank, and in the practice of the law at Toulouse attained a great reputation for learning and eloquence, and led a gay though charitable life. The death of his wife led him to more serious pursuits, and having formed an intimacy with Martin, bishop of Tours, and Paulinus, bishop of Nola, he entered upon an ecclesiastical career, though it is not certain that he preached. His father disinherited him, but his mother-in-law gave him what pecuniary assistance he needed. Having entered a monastery, he spent some years in preparing an abridgment of the scriptural narrative, which from the purity of its style was long a favorite text book in the schools of the middle ages, but is liable to the charge of serious tampering with the facts, arising in part probably from the desire to rebuke in this guise some contemporary rulers. He continued this history, describing the destruction of Jerusalem, and bringing the narrative down to his own time, under the title of "The Chronicle of Sulpicius Severus," in which he varies materially from Josephus. His other works are: "Life of St. Martin, Bishop of Tours;" "Three Dialogues;" and a collection of letters. From the elegance of his Latinity he was called, not undeservedly, "the Christian Sallust." His works have been often printed; Jacob Bernays has republished his "Chronicle" with a commentary (Berlin, 1861).

SULTAN, a title applied to the chief rulers of most Mohammedan countries. It is derived from an Arabic word meaning a despotic ruler, or a man who is the arbiter of the life and property of men. The lawful wife of a sultan who has children by him is called a sultana.

SUMACH (Arab. *simac*), the common name of shrubs of the natural order of *anacardiaceæ*, which likewise comprises lofty trees. The several species have a resinous or milky acrid juice; alternate, dotless leaves without stipules; small flowers imbricated in bud, either polygamous or pentandrous; their ovary 1-celled and 1-ovuled, the stigmas 3; the seed exalbuminous, borne on a curved stalk attached to the bottom of the cell; the fruit indehiscent and drupaceous. The order is represented in the old world by several tropical forms, such as the cashew nut, hog plum, mango, pistachio, &c.; but in the United States by the single genus *rhus*, the *ρους* of Theophrastus, applied to the sumachs on account of the reddish color of their berries. One of the most prominent is the stag's horn sumach (*R. typhina*, Linn.), a tall shrub, sometimes attaining the appearance of a small tree, and even growing 25 feet high, with crooked irregular branches, its leaves pinnate, of many pairs, hairy beneath; the leaflets oblong, lanceolate, sharply serrate; the petioles and the younger branches covered with down like the young horns of a stag, which gives the trivial name to the species. In the autumn the leaves turn to a rich red color, tinted with yellow, orange, and purple. The flowers are diœcious, yellowish green, on a downy-stalked diffused panicle; the calyx short, hairy, with pointed erect segments; the petals of the same color, ovate concave; stamens 5, short, erect, with large anthers filled with orange pollen; in the fertile flowers the stamens are either wanting or else very minute; the stigmas 3, purple, crowning a hairy crimson germ; the fruit of a rich scarlet, turning purple and persistent all winter; the wood of a yellowish green color, brittle, soft, close-grained, and with abundant yellowish pith. The smooth sumach (*R. glabra*, Linn.) is a handsome, spreading, leafy bush, 4 to 10 feet high, with irregular branches; the leaves pointed, with smooth, somewhat glaucous leaflets, 11 to 31 in number, whitened beneath; the flowers greenish yellow. This species sometimes overruns barren and neglected fields, spreading rapidly by means of its long tough roots, and is difficult to exterminate. Its fruit possesses an agreeable acidity, and is variously employed in domestic economy. The acid is bimalate of lime, and exists in crystals of microscopic size among the down of the berries. The dwarf sumach (*R. copallina*, Linn.) is a shrub 1 to 7 feet high, with downy branches and footstalks; the leaves of 9 to 21 leaflets, smooth and shining above, slightly pubescent beneath, on winged-margined leafstalks; the flowers in a terminal panicle, the fertile flowers in smaller panicles; the fruit a compressed, short, ovoid drupe, of an agreeable acid taste. This species is especially beautiful on account of its polished foliage, which in autumn contrasts favorably in its purpling tints with the scarlet fruit. It is common on rocky hills and dry pastures. The *R. pumila* (Mx.) is a dwarf species with low procumbent stem, tomentose branches, and leaves of 11 to 13 leaflets; it occurs on the pine barrens from North Carolina to Georgia. The tanners' sumach (*R. coriaria*, Linn.), a native of southern Europe, is a deciduous shrub, 10 to 15 feet high; its branches covered with a brown hairy bark; the leaves alternate and pinnate, of 7 to 8 pairs of leaflets and a terminal one; the flowers in large compound spikes at the end of the branches, of a whitish green color and appearing in July. It is extensively cultivated in Spain and Portugal for its young shoots, which are ground and employed in tanning, and is the kind used in the preparation of Turkey leather. The fragrant sumach (*R. aromatica*, Aiton) is a dwarf straggling bush found in dry rocky soil from Vermont westward and southward, with fragrant thick leaves of 3 rhombic ovate, unequally serrate leaflets, and pale yellow flowers projecting on short footstalks from angular, hairy-edged, brown, imbricated scales of aments, which grow from the axils of the last year's leaves. It is much cultivated abroad on account of its aromatic foliage. The *R. metopium* (Linn.) has diœcious flowers in loose panicles, oblong, smooth, scarlet drupe, chartaceous nut, arillate seeds, pinnate leaves, and a poisonous juice; it is a tree 15 to 20 feet high, and occurs in southern Florida. Other poisonous species met with at the south are represented likewise at the north in the *R. toxicodendron* (Linn.), known as poison oak and poison ivy (see POISON IVY), and in the poison sumach or dogwood (*R. venenata*, De C.), a shrub 6 to 18 feet high, with nearly smooth branches, the stem light ashen gray, the young shoots purplish, the leaves pinnate on greenish purple petioles and consisting of 7 to 13 leaflets, and the flowers very small, green, in loose axillary panicles. The latter species was at one time confounded with the varnish-bearing sumach (*R. vernicifera*, De C., or *R. vernix*, Linn.); and according to Dr. Bigelow, a similar varnish can be prepared from its juice, the poisonous properties disappearing with the heat employed in boiling it down. The true kind is however a native of Japan and Nepaul. Its leaves are very large and handsome, with 5 or 6 pairs of leaflets, all ovate, long, acuminate, entire, glabrous above and velvety beneath. The varnish is obtained from the juice of the younger branches. It is very hard, and is used extensively in the finish of every kind of woodwork by the Japanese.—The species of sumachs are numerous, and many are ornamental, those of the Cape of Good Hope being suited to the greenhouse and possessing evergreen foliage. For the open ground the Venetian sumach or smoke plant (*R. cotinus*, Linn.) is a conspicuous object in the garden. It is native to southern Europe, and though made use of in Italy under the name of *scotino* for tanning, yet it is mainly cultivated elsewhere for its beauty, growing under good treatment 10 or 12 feet high; its leaves are simple, obovate, smooth, stiff, shining green, supported on long petioles; the flowers are borne in very large loose panicles of elongated hairy pedicels, each flower consisting of 5 small, oval, pale purplish petals; the first half cordate, smooth, veiny; the nut triangular. The fruit is however seldom seen, the pedicels, instead, lengthening indefinitely and producing a beautiful feathery appearance. It prefers a light loam, and is easily propagated by layers. An allied species, the *R. cotinoides* (Nuttall), occurs in the interior of Alabama, with perfect flowers in an open panicle, the pedicels mostly abortive, elongating, and plumose, the drupe smooth.—A species from Japan, the *R. succedaneum* (Willd.), has received some attention from an idea that a wax obtained from its fruit might be profitably employed. Both Kämpfer in the beginning of the last century and Thunberg in his "Travels" (1794), make mention of it. It is described as a shrub 10 to 15 feet high, similar to the varnish sumach, and bearing a berry or drupe, ovate, white, of the size of a cherry, enclosing a smooth nut; on boiling the berries the wax rises to the surface of the water in the form of a concrete volatile oil. It is used in making ornamental candles. According to Professor W. B. Rogers, the substance when cool has the whiteness and apparent purity of bleached beeswax, from which however it differs in various particulars, melting at about 127°, and parting with its fatty substances in alcohol at different temperatures; and Dr. C. T. Jackson found that after the alcohol has extracted all it can, a dry hard wax is likewise obtained by ether. The great readiness with which it is saponified, and the clear strong light it yields when burned in the form of candles, give promise that it may become an article of commercial importance; and especially so should the shrub prove itself adapted to the climate of the United States.—The sumachs possess various economical properties, several being employed in tanning; the bark of *R. glabra* is used as a mordant for red colors, and is considered a febrifuge; the fruit of *R. cotinus* is astringent, and its wood under the name of young fustic is used in dyeing a bright yellow color; the *R. metopium* yields a gum which has powerful emetic, purgative, and diuretic qualities; the root of the stag's horn sumach is administered in fevers; and the juice of the poison sumach stains linen an indelible brown. The several species propagate readily from seeds and from cuttings of the roots, and some deserve a place in ornamental plantations.

SUMAROKOFF, Alexander Petrovitch, a Russian dramatic poet, born in Moscow, Nov. 14, 1727, died there in 1796. He was educated in the land cadet corps, and began to write when 25. His plays were performed at court before the empress Elizabeth, and, encouraged by their success, he established a permanent theatre in the capital in 1756 under the direct patronage of the court. Though dramatic representations had been previously given in Russia, this was the first regular attempt to establish them, and Sumarokoff is considered the founder of the Russian drama. His plays, all upon subjects drawn from Russian history, were published collectively with his other compositions in 1787 in 10 vols. 8vo.

SUMATRA, an island of the Indian archipelago, lying in a N. W. and S. E. direction along the S. part of the Malay peninsula, between lat. 5° 45′ N. and 5° 55′ S., and long. 95° 20′ and 106° 5′ E.; bounded N. by the bay of Bengal, N. E. by the strait of Malacca, the China sea, and the strait of Banca, E. by the Java sea, S. by the strait of Sunda, and S. W. by the Indian ocean; extreme length 950 m., breadth 250 m.; area about 160,000 sq. m.; pop. in 1857 estimated at 4,512,472. Part of the island is subject to the Dutch and part of it to native rulers dependent on that nation, while some portions are governed by independent princes. The Dutch possessions on the main island are divided into 4 governments, viz.: Sumatra (capital, Padang), on the W. coast, between lat. 0° and 1° 55′ S., pop. 1,560,664; Bencoolen, on the same coast, S. of the former, pop. 114,460; Lampong, occupying the S. part of the island, pop. 85,525; and Palembang, on the E. coast, pop. 478,363; total pop., Dec. 31, 1859, 2,239,012. The islands of Banca and Rhio, off the coast, with several smaller islands attached to each, constitute separate Dutch governments. The independent states extend from lat. 2° S. on the N. E. coast round the N. end of the island as far as lat. 2° N. on the opposite side, and consist of Acheen, Batta, and some smaller states. A chain of islands stretches along the S. W. coast of Sumatra, parallel to and about 60 m. distant from the land, the most important of which are Hog island, lat. 2° 50′ N., about 50 m. long by 10 broad, high and well wooded; Pulo Nias, the largest in the chain, also high and well wooded, and thickly inhabited; Pulo Mintao, about 48 m. long by 16 broad, the N. point of which is almost on the equator, and the S. part uninhabited; North Pora, about 30 m. long and 10 broad, separated by the Seaflowers channel from South Pora, about 36 m. long, both high and well wooded, and with several good harbors; the Nassau or North and South Poggy islands; and Engano, the southernmost of the chain, about 24 m. long by 18 broad, with inhabitants speaking a different language from that of the people of the other islands and of Sumatra. The Baniah islands lie in the strait which separates this chain from Sumatra, and are inhabited by people of the Malay race; the chief production is edible birds' nests. Beside the islands just described, there are numerous islands and shoals fronting the coast between Indrapoor and Tapanooly.—There are many good harbors on the S. W. coast of Sumatra, that of Tapanooly being considered one of the finest in the world. The whole of this coast is exposed to a very heavy surf, and more especially that portion which lies S. of the equator. About 150 m. of the N. coast, between Acheen and Diamond point, is called the coast of Pedir; it is high and bold, and the anchorage is mostly in open roadsteads. The N. E. coast is low, and toward the narrowest part of the strait of Malacca the shore becomes faced with sand and mud banks, and the navigation intricate and dangerous. The island of Rupat, lat. 2° 10′ N., which extends about 25 m. each way, is separated from Sumatra by a narrow strait, only navigable by small vessels. Between lat. 1° 36′ and 0° 35′ N. are 3 large islands, called Bacalisse, Pedang, and Rankan, with a navigable strait from 1 to 5 m. broad between them and Sumatra. The coasts of these islands, and also of Sumatra as far as the E. side of the strait of Sunda, are exceedingly low, fronted by mud banks, and part of the land inundated at high tide.—There are many rivers on the S. W. coast, but they have all short courses and are very rapid. Upon the opposite side of the island there are some large rivers, the chief of which are the Rawas, or Palembang, which falls into the strait of Banca, and is navigable for 200 m.; the Jambi, Indragiri, Campore, Sumpar, and Singkel. In the lower part of their courses these rivers are very sluggish, and they all have extensive deltas at their mouths. There are several lakes in the mountain valleys toward the W. side of Sumatra, the best known of which are Sinkara, Dano, and Daho, the last named said to lie at an elevation of 4,000 feet above the sea. The S. W. coast is bold and mountainous, with high cliffs rising in many places from the ocean. Parallel to the coast 3 or 4 chains of mountains, varying from 2,000 to 5,000 feet in height, with peaks of still greater altitude, run the whole length of the island. These mountains are clothed with forests of luxuriant growth, and for about 350 m. the breadth of level ground between the shore and the mountain forest is not more than 2 m. Toward the N. end of the island this tract increases to about 8 m., and in a few places it has a width of from 15 to 20 m. Along these chains are about 20 volcanoes, some of which rise much higher than the general mountain mass. The country lying upon the N. E. coast is not much elevated above the sea, but toward the interior the ground rises and forms plains of great extent, while that enclosed between the mountain ridges to the W. is an elevated table land with a hilly broken surface. Basalt, granite, trachyte, syenite, red sandstone, and limestone are all found in Sumatra. Iron ore, copper, and tin are abundant, and gold is collected in many of the streams, but principally in the Jambi and Indragiri and their tributaries. Petroleum, sulphur, and steatite are also found.—The climate of Sumatra is warm and moist, the thermometer ranging throughout the year between 76° and 93°, and rain falling almost incessantly, more particularly in the S. In the neighborhood of the marshes it is very unhealthy, but in the elevated districts and upon the S. W. coast it is said to be favorable to longevity. The soil is remarkable for its fertility, but the greater part of the island has been very imperfectly explored. Much of the E. coast is covered with mangrove bushes. Further inland are found palms, and trees of gigantic growth, few of them being less than 100 feet in height. On the W. shore, beside the myrtle and several varieties of fig, all the fruit trees common to the archipelago abound, and most of the mountains are covered to their summits with jungle. The *Rafflesia*, a parasitic flower found adorning the trees of the forests, is a yard in diameter, and has a calyx capable of containing 6 quarts. Rice is extensively cultivated. The cocoanut, betelnut, sago tree, capsicum, pepper, turmeric, ginger, coriander, &c., are all grown. Camphor and benzoin are found in the forests in the N. part of the island; and caoutchouc, or the India rubber tree, abounds. Elephants are numerous in the forests; tigers of great size and ferocity are common. The buffalo exists both wild and domesticated. The horses are small, and generally piebald. The boa constrictor sometimes grows to an immense size.—The inhabitants of Sumatra are of the Malay race, of which the island is supposed to have been the cradle. They are divided into several tribes, who speak languages that are considered as dialects of one common tongue. Beside those of Malay origin, there are two nations who live in the woods in a savage state and have little intercourse with the others. They are called the Orang Kubu and the Orang Gugu, and their origin is involved in obscurity. The people of the N. part of Sumatra about Acheen are taller, stouter, and of darker complexion than the other tribes, and are supposed to have a considerable infusion of Hindoo blood. The Bataks or Battas, who occupy the country immediately S. of these people, are smaller and of lighter complexion, and in some respects a very singular race. (See BATAK.) Mohammedanism is the prevailing religion, but it is in a relaxed state, and the people of the interior cannot be said to belong to any particular faith. These tribes have a religious system of their own, and their priests exercise great authority over them. The Malays round the coast appear to be collected from different parts of the archipelago, and many Chinese have settled about the S. end of Sumatra. The ordinary dress is a turban and loose trowsers reaching to the knee; the upper part of the body is commonly uncovered in both sexes, but a scarf is sometimes worn about the shoulders. The houses are raised on posts or pillars from 4 to 8 feet from the ground, and in some parts of the country they are erected in trees. Those of the poorer classes are made of bamboo and thatched with grass, but the houses of the more wealthy are generally framed of wood and the sides enclosed by large sheets of bark. Agriculture is in a very rude state. The labors of the field are for the most part carried on by the women. Polygamy is not common, except among the chiefs, who have sometimes

6 or 8 wives each. The inhabitants have arrived at a considerable degree of perfection in the manufacture of iron and steel, and the kreese or dagger blades made in Sumatra are highly esteemed. Many kinds of tools, silk cloth, and earthenware are made; and the gold and silver filigree work is much admired. The trade of Sumatra is principally carried on with Java, Madura, Singapore, Malacca, Penang, and British India. The chief exports are pepper, gold dust, camphor, nutmegs, cloves, mace, benzoin, gutta percha, copper, tin, sulphur, and coral. In 1854 there arrived in the principal ports of Sumatra, from Java and Madura alone, 964 vessels of an aggregate of 44,446 tons.—The Malay name of Sumatra is Pula Percha, and the island was first called Sumatra by Nicolo di Conti, who visited it before 1449; Marco Polo calls it Java Minor. In 1509 the Portuguese first reached the country. They arrived on the N. coast, and found the territory around Acheen ruled by a powerful king, who effectually opposed their obtaining a footing. Internal discord shortly afterward reduced the power of the kingdom to insignificance. The Dutch arrived on the N. coast about the close of the 16th century, and the English soon afterward made their appearance. The former nation formed a settlement at Padang in 1649, and the latter at Bencoolen in 1685. The Dutch got possession of some districts in the S. part of the island and established several factories. In 1811 their settlements on Sumatra, together with the island of Java, were taken by the British, but were restored in 1816. In 1824 the British exchanged Bencoolen for Malacca and small settlements upon the coasts of Hindostan. By fomenting internal feuds, and taking the side of a number of petty chiefs, the Dutch have since found means to annex a great extent of territory.—See "History of Sumatra," by W. Marsden (4to., 3d ed., London, 1811).

SUMBAWA, or SOEMBAWA, an island of the Indian archipelago, in the Sunda chain, lying between Floris on the E. and Lomboe on the W., the S. W. point situated in lat. 9° 2′ S., long. 116° 42′ E.; length E. and W. 160 m., extreme breadth 50 m.; pop. about 80,000. The coasts are very much indented by arms of the sea, and lined by several small islands. It is divided into 6 native states, each governed by a rajah who acknowledges the supremacy of the Dutch. Of these states Tomboro and Sumbawa are on the N. coast, Bima on the E., where the Dutch have a resident, and Dompo, Sangar, and Papakat on the other parts of the island. The surface is mountainous, and many of the summits have a very remarkable appearance. The most singular of these is Tomboro, a volcano near the N. coast, 8,940 feet high, which had a dreadful eruption in 1815, the noise of which was heard over an area with a radius of more than 800 m. Many thousand people were killed; the ashes fell in Java to the depth of several inches, and even in Sumatra at the distance of 840 m. from the volcano. In 1836 another eruption occurred, but less destructive. Gold is found, and the most valuable mineral products are sulphur and saltpetre. Sandal and sapan wood and teak are all found, but the last is not very abundant. There are two breeds of horses, one of which is the best in the Indian archipelago, and is extensively exported. The pearl oyster is found. The manners and language of the natives bear a strong resemblance to those of the inhabitants of Celebes. The island has been subject to the Dutch since 1676.

SUMMER, the warm season of the year, including astronomically the time between the vernal and autumnal equinoxes, or from about the 21st of June till about the 22d of September. As one of the four seasons into which the year is popularly divided, the summer comprises in the United States the months of June, July, and August; in England, May, June, and July.—The Indian summer is a period of warm, pleasant weather, which usually occurs every year over the northern portion of the United States after the autumnal storms, and continues often without interruption 2 or 3 weeks, when it is succeeded by the cold weather and storms of the winter. It appears to be a more decided season in the interior than near the coast, and in the region of the great lakes is especially noticeable, the waters during its continuance remaining placid, in marked contrast to their disturbed condition in the earlier part of the autumn, the weather mild and pleasant, and the atmosphere filled with a peculiar haziness. At this time the woods are in their brightest colors, the leaves before their fall assuming the brilliant autumnal hues peculiar to the American climate. It is a fine season to navigate the lakes, and is usually looked for in that region during the first portion of November. Further east it appears to be somewhat earlier. It is especially recognized by the prevailing hazy atmosphere and gentle S. W. breezes. It was a favorite season with the aborigines, and is hence called Indian summer. They regarded it, as stated by the Rev. James Freeman, as the gift of their most honored deity, the god of the south-west, who sends the S. W. winds, and to whom they believed their souls to go after their decease.

SUMMERFIELD, JOHN, an American clergyman, born in Preston, England, Jan. 31, 1798, died in New York, June 13, 1825. He was educated at a Moravian school, was destined by his father for the Methodist ministry, and exhibited great precocity of intellect, but early fell into irregular habits, which at one time brought him into prison at Liverpool. In 1813 his father removed to Dublin, where at the age of 19 the son joined the Wesleyan society. In 1819 he was received on trial as a preacher in the Irish conference, and in 1821 removed with his father to America, and was received as a preacher in the New York conference. Such was his peculiar and chastened eloquence that persons of all denominations, and of all classes and professions in society, flocked in crowds to hear him, and his services were sought for on all popular religious occasions. In 1822 he visited Philadelphia, Baltimore, and Washington; but his constitution, naturally feeble, gave way under his excessive labors, and for the purpose of recruiting his health he sailed in December for France. While in Paris he attended the anniversary of the French Protestant Bible society as a representative of the American Bible society, for which he prepared an address which was published in French. After spending some time in England, he returned to New York in April, 1824, with little change in his health; but he continued to travel and preach whenever possible, with undiminished success. Shortly before his death he aided in founding the American tract society. A volume of his "Sermons and Sketches of Sermons" has been published (8vo., New York), and a biography by John Holland (8vo., New York, 1829).

SUMMERS, Thomas Osmond, D.D., an American clergyman, born near Corfe Castle, Dorsetshire, England, Oct. 11, 1812. In his 18th year he came to the United States, joined the Methodist Episcopal church in 1832, began to preach in 1834, and was admitted into the Baltimore conference in March, 1835. His first appointment was to the Augusta circuit, in Virginia, on which he had to travel 250 miles and preach 30 sermons a month. In 1840 the bishop appointed him to the republic of Texas; and he was one of the 9 preachers who constituted the first Texas conference, which was organized in Dec. 1840. In 1844 he became a member of the Alabama conference. He was secretary of the convention at Louisville, Ky., at which the M. E. church, South, was organized, and at the general conference of 1846 was appointed assistant editor of the "Southern Christian Advocate," and also chairman of the committee to compile the new hymn book, the labor of which principally devolved upon him. In 1850 he was elected by the general conference its editor of books and tracts, and of the "Sunday School Visitor," and in 1858 also of its "Quarterly Review." He has been secretary of every general conference. Beside numerous tracts and pamphlets, and introductions, notes, &c., to various works, he has written "A Treatise on Baptism" and "A Treatise on Holiness;" the "Sunday School Teacher, or the Catechetical Office;" "Seasons, Months, and Days;" "Talks Pleasant and Profitable;" "The Golden Censer;" "Scripture Catechism," in 2 vols. (Old and New Testaments); and "Questions on Genesis."

SUMMIT. I. A N. E. co. of Ohio, drained by the Cuyahoga and the head streams of the Tuscarawas river; area, 400 sq. m.; pop. in 1860, 27,840. It is the most elevated land on the line of the Ohio canal, and hence the name. The surface is uneven, and the soil highly fertile. The productions in 1850 were 325,642 bushels of wheat, 365,762 of Indian corn, 225,998 of oats, 237,533 of rye, 100,393 of potatoes, 37,793 tons of hay, 1,927,351 lbs. of butter, and 268,971 of wool. There were 4 newspapers, 33 churches, and 9,614 pupils attending public schools. Bituminous coal and mineral paint are found in abundance, and exported largely. There is an ample supply of water power. The Cleveland and Pittsburg and the Cleveland, Zanesville, and Cincinnati railroads, and the Ohio canal traverse the county. Capital, Akron. II. A new co. in Utah territory; pop. in 1860, 198.

SUMNER, a N. co. of Tennessee, bordering on Kentucky, bounded S. by the Cumberland river, and drained by affluents of Big Barren river; area, 600 sq. m.; pop. in 1860, 22,030, of whom 7,700 were slaves. The surface is undulating and the soil fertile. The productions in 1850 were 1,375,590 bushels of Indian corn, 209,077 of oats, 38,874 of wheat, 809,517 lbs. of tobacco, and 197,213 of butter. There were 21 churches, and 1,542 pupils attending public schools. It is intersected by the Louisville and Nashville railroad. Capital, Gallatin.

SUMNER, Charles, an American statesman, born in Boston, Mass., Jan. 6, 1811. His father, who died in 1839, was a lawyer by profession, and during the latter part of his life was sheriff of the county of Suffolk. The son received his early education at the Boston Latin school, and was graduated at Harvard college in 1830. He continued in private the studies of college life for a year, and then entered the law school at Cambridge, where he formed with his teacher, Judge Story, an intimate friendship which continued till the death of that eminent jurist. He was admitted to the bar in 1834, and soon attained a larger share of practice than any other lawyer in Boston so young in the profession. He was appointed reporter of the circuit court of the United States, in which capacity he published 3 volumes known as "Sumner's Reports," containing decisions of Judge Story. He also at the same time edited the "American Jurist," a quarterly law journal of high reputation. During the first 3 winters after his admission to the bar, while Judge Story was absent in Washington, Mr. Sumner was appointed lecturer to the law students, and part of the time, during the absence of Prof. Greenleaf, he had sole charge of the school. His favorite topics were those relating to constitutional law and the law of nations. In 1836 he was offered a professorship in the law school, and also one in the college, both of which he declined. In 1837 he visited Europe, where he remained till 1840, travelling in Italy, Germany, and France, and residing for nearly a year in England. On his return to Boston he resumed practice, and in 1844–'6 published an elaborate edition with annotations of "Vesey's Reports" in 20 vols. Though voting with the whig party, he took no active part in politics till 1845, when on the 4th of July he pronounced before the municipal authorities of Boston an oration on "The True Grandeur of Nations," in which, prompted by the menacing aspect of affairs between the United States and Mexico, he denounced the war system as the ordeal by battle still unwisely continued by international law as the arbiter of justice between nations, and insisted that this system ought to give way to peaceful arbitration for the adjudication of international questions, as the private ordeal of battle had given way to such substitutes in the administration of justice between individuals. His oration attracted unusual attention, led to much controversy, and was widely circulated both in America and Europe. It was pronounced by Richard Cobden to be "the most noble contribution made by any modern writer to the cause of peace." It was followed by a rapid succession of public addresses on kindred themes before literary and academic societies and popular assemblies, which were also widely circulated in print. Mr. Sumner earnestly engaged in the opposition to the annexation of Texas on the ground of slavery, and at a popular meeting in Faneuil hall, Nov. 4, 1845, made a speech against that measure which was warmly applauded. In the following year he made an address to the whig state convention of Massachusetts on "The Anti-Slavery Duties of the Whig Party," and shortly afterward published a letter of rebuke to Mr. Robert C. Winthrop, who then represented Boston in congress, for his vote in favor of the war with Mexico. These steps led eventually to Mr. Sumner's separation from the whig party and association with the freesoilers, to whose candidates, Van Buren and Adams, he lent efficient support in the presidential contest of 1848. After the withdrawal of Mr. Webster from the senate of the United States by his entrance into the cabinet of Mr. Fillmore in 1850, Mr. Sumner was nominated for the vacancy by a coalition of freesoilers and democrats in the Massachusetts legislature, and was elected after a most earnest and protracted contest, which attracted the universal attention of the country, and the termination of which was publicly celebrated in many places by the anti-slavery party. His first important speech was upon the fugitive slave act, against which he argued that congress had no power under the constitution to legislate for the rendition of fugitive slaves; and that if it had, the act in many essential particulars conflicted with the constitution, and was also cruel and tyrannical. In this speech Mr. Sumner laid down as a guide for political action the formula to which he has since adhered, that "freedom is national and slavery sectional." In the debate on the repeal of the Missouri compromise and on the contest in Kansas, Mr. Sumner took a very prominent part. His last speech upon this topic, which was subsequently printed under the title of "The Crime against Kansas," occupied two days in its delivery, May 19 and 20, 1856. Some passages in it greatly incensed the members of congress from South Carolina, one of whom, Preston S. Brooks, on May 22 assaulted Mr. Sumner while writing at his desk in the senate chamber, and with a gutta percha cane struck him on the head till he fell to the floor insensible. (See BROOKS, PRESTON S.) The injury thus received proved very serious, and was followed by a severe and long disability, from which his recovery was not complete till 3 or 4 years later. His term of office as senator expired March 4, 1857, and in the preceding January the legislature of Massachusetts had reëlected him by a unanimous vote in the senate, while in the house of representatives, consisting of several hundred members, he received all but 7 votes. Under the advice of physicians he went to Europe for the benefit of his health in March, 1857, and returned in the autumn to resume his seat in the senate. His health being still impaired, he went abroad again in May, 1858, and submitted to a course of extraordinarily severe medical treatment in Paris, which did not terminate till the autumn of 1859, when he again returned home. His first serious effort after the restoration of his health was an elaborate speech in the senate, denouncing the influence of slavery on character, society, and civilization, which was subsequently printed under the title of "The Barbarism of Slavery." In the presidential contest of 1860 he took an active part, and made several speeches in behalf of Abraham Lincoln and Hannibal Hamlin, the successful candidates. In the senate, during the discussions resulting from the secession of the slave states, he earnestly opposed all concession to or compromise with slavery, and early proposed emancipation as the speediest mode of bringing the war to a close. He also urged the same policy in popular addresses at Worcester, Mass., Oct. 1, and New York, Nov. 27, 1861. In these and in his other efforts against slavery, he has based his arguments not only on moral and historical, but on constitutional grounds, and has always claimed that the positions he has taken and the measures he has advocated are in strict accordance with the constitution of the United States. Since March 4, 1861, he has been chairman of the senate committee on foreign relations, and on Jan. 9, 1862, delivered an elaborate speech arguing that the seizure of Messrs. Mason and Slidell on board the steamer Trent was unjustifiable on the principles of international law which had always been maintained by the United States. Mr. Sumner is the author of a work on "White Slavery in the Barbary States," expanded from a lecture (12mo., Boston, 1853); and two collections of his addresses have been published: "Orations and Speeches" (2 vols. 12mo., Boston, 1850), and "Recent Speeches and Addresses" (12mo., Boston, 1856).

SUMNER, INCREASE, an American statesman and judge, born in Roxbury, Mass., Nov. 27, 1746, died there, June 7, 1799. He was graduated at Harvard college in 1767, and afterward took charge of the grammar school at Roxbury, and at the same time studied law in the office of Samuel Quincy. He was admitted to the bar in 1770, and in 1776 was elected a member of the state legislature, where he continued to hold a seat till 1782. He was also a member of the convention held in 1777 "for agreeing on a form of government," and of that of 1779 for forming a state constitution. In 1782 he was elected by the legislature a member of congress, but did not take his seat in that body, having in the same year been appointed an associate judge of the supreme judicial court. In 1797 he was elected governor, and reëlected in 1798 and 1799 with remarkable unanimity. His intimate relations with the leading statesmen, and especially with his kinsman John Adams, then president, enabled him to exercise much influence in public affairs.

SUMNER, John Bird, 90th archbishop of Canterbury, and primate of all England, born at Kenilworth, Warwickshire, in 1780. He was educated at Eton, and at King's college, Cambridge, and in 1820 was appointed canon of Durham, and in 1828 bishop of Chester, in which capacity he gave a remarkable impulse to the establishment of churches and infant schools. In 1848 he was translated to the archbishopric of Canterbury. He is a liberal in politics, and is considered the leader of the low church or evangelical portion of the Anglican establishment. He is the author of an essay on "Apostolical Preaching;" "The Records of Creation," which obtained the 2d Burnett prize of £400; "Evidences of Christianity;" "Exposition of the Acts of the Apostles;" "Chester Charges;" and of several volumes of sermons.

SUMTER. I. An E. district of S. C., bounded W. by the Wateree and Santee rivers, and S. by the Santee, and drained by Black river and its affluents; area, about 1,500 sq. m.; pop. in 1860, 23,860, of whom 16,682 were slaves. The surface is generally undulating and the soil fertile, and there are extensive forests of pine. The productions in 1850 were 750,520 bushels of Indian corn, 7,410 of wheat, 44,465 of oats, 376,555 of sweet potatoes, and 18,779 bales of cotton. There were 37 grist mills, 7 saw mills, 3 tanneries, 1 cotton gin factory, 62 churches, 2 newspaper offices, and 504 pupils attending public schools. It has water communication by the Santee river, and is intersected by the Wilmington and Manchester railroad. Capital, Sumterville. II. A S. W. co. of Ga., bounded E. by Flint river, and intersected by Muckalee and Kinchafoonee creeks; area, 590 sq. m.; pop. in 1860, 9,428, of whom 4,890 were slaves. The surface is level and the soil fertile. The productions in 1850 were 354,842 bushels of Indian corn, 120,333 of sweet potatoes, and 7,535 bales of cotton. There were 25 churches, and 265 pupils attending public schools. Capital, Americus, to which there is a branch railroad from Macon. III. A central co. of Fla., bounded W. by the Withlacoochee river; area, about 400 sq. m.; pop. in 1860, 1,549, of whom 549 were slaves. The surface is generally level and swampy, and there are several small lakes, the principal of which are Lakes Eustis, Griffin, and Yale. Capital, Adamsville. IV. A W. co. of Ala., bordering on Miss., bounded E. by the Tombigbee, and intersected by the Noxubee river; area, about 800 sq. m.; pop. in 1860, 24,085, of whom 18,091 were slaves. The surface is uneven and the soil fertile. The productions in 1850 were 926,826 bushels of Indian corn, 62,359 of oats, 182,007 of sweet potatoes, and 14,066 bales of cotton. There were 27 churches, 2 newspaper offices, and 438 pupils in public schools. It has water communication by the Tombigbee river, and is intersected by the proposed route of the Alabama and Mississippi railroad. Capital, Livingston.

SUMTER, Fort, a work at the entrance of Charleston harbor, S. C., built upon an artificial island, and situated about 2¾ m. from Castle Pinckney, the fort at the point of the peninsula on which Charleston is situated, and nearly the same distance from Fort Moultrie. It is a fort of the 2d class in size; its foundations are of stone, and the walls from the water line up, 50 feet high, of brick, filled in with concrete. It was several years in building, and cost nearly $1,000,000. Its form is that of a truncated pentagon, with one side parallel to the adjacent shore and presenting an angle to the channel. Of the truncated angles, those on the E., W., and N. are simply formed into *pans coupés*, while the other 2 are each composed of 2 small faces, making an angle of about 15° with the side of the pentagon, and having a sally port at the intersection of their faces. It was intended to mount 140 guns upon the fort, in 3 tiers, the upper *en barbette*, the 2 lower in casemates. Of these guns 30 were to be 64-pounders, 30 32-pounders, 40 24-pounders, 10 8-inch and 10 10-inch columbiads, and 10 13-inch and 10 10-inch mortars. The fort was as yet unfinished, and but few of the guns were mounted, when on Dec. 26, 1860, Major Robert Anderson removed his garrison by night from Fort Moultrie to Fort Sumter. The garrison consisted of about 70 soldiers, with 30 or 40 workmen. This removal was construed by South Carolina, which had 6 days before published her secession ordinance, as an act of war, and the surrender of the fort demanded from the U. S. government, but not conceded. Meantime Major Anderson exerted himself with his little force to put the fort in a condition of defence, by mounting what guns he could, raising and revetting the parapet, &c. He was able to mount but 52 guns in all, 27 on the ramparts and 25 in casemates, and but few of these his heaviest guns. The South Carolina authorities erected batteries and strengthened those already erected, so as to place the fort under ¾ of a circle of fire, and many of their guns were of very heavy caliber. Supplies were also cut off, and the garrison reduced almost to a state of starvation. Unsuccessful attempts were made by the U. S. government to furnish supplies or reënforcements to the fort, and about midnight of April 11 its instant surrender was demanded by Gen. Beauregard, the commander of the beleaguering forces. Major Anderson, whose provisions were exhausted, answered that unless he received relief he would capitulate on the 15th; but the order for surrender was repeated peremptorily and refused, and before 4 A. M. the bombardment commenced. The garrison replied through that day and till noon of the next, when their cartridges were nearly exhausted, and, the barracks and woodwork having been set on fire by the shells from the batteries, preventing access to the magazine, their fire slackened. Mr. Wigfall, acting as aid to Gen. Beauregard, came to the fort with a flag of truce, and himself hoisted upon it a white flag; and Major Anderson and the garrison marched out with the honors of war, first saluting the U. S. flag with 50 guns. The bombardment of this fort was the first act of the war between the U. S. government and the seceded states.

SUMTER, Thomas, an American revolutionary general, born in South Carolina about 1734, died near Statesburg, S. C., June 1, 1832. Little is known of his history previous to the opening of the revolutionary war, when he appears as lieutenant-colonel of a regiment of South Carolina riflemen. After the capture of Charleston by the British in 1780, he took the field as a brigadier-general at the head of a body of light horse, and soon became one of the most active and able partisan leaders of the South. His bravery, endurance, and unvarying cheerfulness and determination under reverses gained him from his followers the sobriquet of the "Carolina game cock," and Cornwallis confessed that he was one of his "greatest plagues." After gaining important successes over the British and tories, he was, in Sept. 1780, routed with considerable loss near the mouth of Fishing creek on the Catawba by Tarleton. By great exertions he soon collected another corps of light troops, and on Nov. 8 defeated Col. Wemyss, who had attacked his camp in Chester district near Broad river. Twelve days later Tarleton attempted to surprise him while encamped at Blackstocks on the Tiger river, but was compelled to retreat with severe loss, leaving his wounded to the mercy of the victor. Sumter, having been severely wounded in this encounter, retired for a while into North Carolina; but in Feb. 1781, he again took the field with undiminished activity, and, in concert with Marion, Pickens, and other partisan chiefs, carried on a harassing warfare against the enemy's scattered posts in the low country. He subsequently participated with credit in the battle of Eutaw Springs, but was soon after compelled by ill health to retire from active service. In Jan. 1781, congress passed a complimentary resolution of thanks to him and his men. He was afterward for several years a member of congress from South Carolina, and in 1809 was appointed minister to Brazil, where he remained two years. Upon his return he was elected a U. S. senator from South Carolina. The latter years of his life were passed in retirement.

SUN, the central body of the planetary system, and the great source of light and heat. It is a globe of 888,842 m. in diameter, or nearly 3.7 times the distance of the moon from the earth. Its mean distance is 95,308,650 m. according to the determinations made at the last transit of Venus in 1769, though this estimate has not the perfect confidence of astronomers. A second of angular measurement at the earth corresponds to 461 m. of the sun's surface. Its volume is 1,415,225 times that of the earth, though its density being only .2543 the density of the earth, its weight is no more than 354,936 times that of our planet. Gravity at its surface is 27.9 times what it is at the earth; that is to say, a body weighing 100 lbs. here would weigh on the surface of the sun 2,790 lbs. It has an apparent motion among the stars from west to east along a great circle called the ecliptic (see Astronomy, and Ecliptic), making a complete circuit of the heavens in 365 days, 6 hours, and 9 minutes, though the period from midsummer to midsummer is some 20 minutes less, owing to the precession of the equinoxes. (See Precession.) This motion is not uniform, due in part to the obliquity of the ecliptic, and in part to the eccentricity of the same; it is greatest about Dec. 31, when it amounts to 1° 1′ 9.9″ daily, and least about July 1, when it is 0° 57′ 11.5″. It has also 3 true motions: 1, an axial rotation, which it performs in 25d. 8h. 9m., the axis being inclined to the plane of the ecliptic 7° 9′; 2, a sort of orbital motion around the centre of inertia of itself and its system of planets, but in consequence of the great superiority of its mass over the aggregate mass of all the other bodies of the system, this centre of inertia is always within the sun's volume; 3, a progressive movement through space, in the direction of the constellation Hercules, and at the rate of 154,185,000 m. a year. Like the moon, it undergoes a slight alteration in apparent diameter in consequence of its apparent orbit being elliptical. It reaches its maximum diameter of 32′ 35.6″, and its minimum diameter of 31′ 31″, simultaneously with its greatest and least apparent velocity, these two variations being due to the same cause.—Solar eclipses vary in number from 2 to 5 every year. They are called total, annular, or partial, according to the amount of the sun's disk covered by the superposed moon. An annular or ring eclipse can only happen when the apparent diameter of the sun is greater than that of the moon. A total eclipse of the sun is not accompanied by utter darkness, the degree of light being different for different places of observation. In the great eclipse of 1860, as observed in Spain, the photograph yielded results which showed a greater degree of light than is afforded by the full moon, and yet elsewhere in the track of the shadow the darkness was so great that thermometers could not be read. This light proceeds from a halo which encircles the disk of the moon at such junctures.—When the sun is examined through a telescope, its surface is found to be marked by black spots edged with a penumbral fringe of uniform shade; they appear sometimes singly, sometimes in groups. These spots are not permanent, but undergo changes of form from day to day, or even from hour to hour, indicating a gaseous form of matter. They seldom last longer than 6 weeks, and often only a few hours. They are seen to break out and enlarge, or to contract and disappear; and occasionally one is observed to divide into several. When they disappear, the black centre, or nucleus, always vanishes before the penumbra. Mr. Dawes, an English observer, has noticed a violent whirling going on in some of the spots. Father Secchi, of the Roman college, describes one as presenting a filamentous aspect, the filaments seeming like currents and appearing to describe spiral curves. Their size is sometimes enormous. Mayer records having seen one in 1758 whose diameter was $\frac{1}{20}$ that of the sun; and Secchi thinks some spots are deeper than the earth's radius. They are not scattered promiscuously over the surface of the sun, but are almost entirely confined to a belt of 25° on either side of the equator, the northern being much the favorite hemisphere. The zone of 3° N. and 3° S. of the equator is nearly barren of spots. This distribution suggests the idea that they may be connected somehow with the rotation of the sun; and Sir John Herschel infers the existence of a movement in the solar atmosphere analogous to our trade winds. According to Laugier, they seem to have a motion of approach toward the nearest pole; and these motions are strikingly correspondent on opposite sides of the equator, a fact which lends confirmation to Herschel's supposition. Often, just before disappearing, the spots undergo remarkable changes. Ridges of light are seen to dart across the chasm, splitting it into many parts, and these have been known to separate from each other and dart along in new and disturbed paths. Here again is suggested an analogy to our trade winds. Schwabe, of Dessau, by a most persevering study of the spots for upward of a third of a century, during which he has recorded the number visible on each day for nearly 300 days in every year, arrived at a remarkable law of periodicity affecting them. They are found to gradually increase in number up to a certain period, and then to decrease to a certain period, and then to increase again, and so on. The cycle is completed, according to this investigator, in 10 years. Prof. Wolff, of Zürich, has, by collating the ancient observations, deduced a period of 11.11+ years as the length of the cycle. (See Magnetism, Terrestrial.) Sabine, Lamont, and Gautier have arrived at similar results independently. In the *Comptes rendus* for Jan. 1859, Prof. Wolff presents a formula according to which the abundance of the spots is determined by the position of the 4 planets, Jupiter, Saturn, Venus, and the earth. Beside the spots, the telescope reveals minute dark dots or pores mottling the surface, and these are found to be in constant fluctuation. Sir John Herschel compares their appearance to the slow subsidence of some flocculent chemical precipitates in a transparent fluid when viewed perpendicularly from above. Near the great spots or groups of spots there are often seen streaks more luminous than the neighboring surface, called *faculæ*. They are oftenest seen toward the borders of the disk. Mr. Dawes saw, on Oct. 22, 1859, in a large mass of faculæ, one bright streak forming the very edge of the sun, and projecting irregularly beyond the circular contour, reminding him of a ridge of low hills often seen at the enlightened limb of the moon. M. Chacornac, a most diligent French investigator, observed on one occasion a sudden transformation of the luminous part of the photosphere into dark parts; luminous bridges were seen crossing the spots, and then gradually becoming dark. As these luminous bridges darkened, they at the same time plunged into the deeper parts, and became covered with other luminous bridges which formed above them. Whether any or all these remarkable changes going on in the surface of the sun have any thing to do with the climate of the earth, as some maintain, remains for the future investigator to determine.—The spots were among the earliest discoveries of the telescope. They were seen about the same time by Galileo, Scheiner, Fabricius (who was the first to publish an account of them), and Harriot; and it was by watching them that these early observers determined the rotation of the sun and the approximate period of the same, and inferred the existence of a solid, dark nucleus enveloped by a luminous atmosphere. In China they appear to have been observed as early as A. D. 321. There is no account extant, however, of any careful series of observations upon them till 1769, when Dr. Alexander Wilson, of Glasgow, turned his attention to them. He distinguished the dark nucleus and its penumbral fringe, and noticed that one side of the latter became gradually narrower as the spot approached the central line of the solar disk, and that the opposite side became at the same time gradually wider. To account for this phenomenon, he supposed the dark nucleus to be, as Galileo and his contemporaries had hinted, a portion of the opaque surface of the sun exposed to view through a funnel-shaped opening in a luminous atmosphere, and the penumbra to be the side walls of the funnel seen in the general direction of the axis of the opening. A similar view was held independently by Bode, of Berlin, a few years later. Beside the luminous envelope, Wilson suspected the presence of a second and less luminous covering within the other. In 1779 Sir William Herschel investigated the subject, and adopted and brought forward in a clear exposition the theory of Wilson.—Up to 1851 the state of our knowledge respecting the remarkable phenomena presented at total eclipses of the sun was very unsatisfactory. A plan of observations was organized for observing the eclipse of that year with a view to establishing the true character of the phenomena; and now at every favorable recurrence of total eclipses of the sun elaborate preparations are made on every side for observing it. There is seen, first of all, during total obscuration, a corona of white light encircling the black disk of the moon like the glory round a saint's head in pictures; secondly, in this corona, and jutting out from the margin of the moon or separated altogether from it, are seen, often with the unassisted eye, flame-like objects of various colors and forms. The corona is marked, in various parts of its circumference, by long outlying streamers of light. These, according to the united testimony of Secchi, De la Rue, Foucault, and Von Feilitzsch, who watched the phenomenon in the eclipse of 1860, are most perceptible where the colored forms appear. It is the opinion of some, Leverrier and Foucault among the number, that the corona does not belong to the solar atmosphere. The latter considers it an example of the "interference of light" (see DIFFRACTION), the phenomenon being held to be analogous to the colored fringes seen on a screen in a darkened chamber when a solar beam is admitted through a chink in the wall. To this theory Prof. Airy raises the objection that if, in order to make the assumed analogy perfect, the eye be placed in the position of the screen, no colored fringes are seen. It is shown that the corona has the property of polarization, and hence is composed of reflected light. Prazmowski has further proved that the plane of polarization passes through the sun, the corona, and the observer. All this, in the judgment of Prof. Airy, points strongly toward the existence of an atmospheric medium, capable of reflecting light, extending from the earth to the moon. The colored forms, or prominences, have long been objects of great interest to astronomers. They were noticed as early as 1706 by Capt. Strannyan at Bern, and more distinctly by Vassenius at Gothenburg in the total eclipse of May 3, 1733. The early observers took them to be solar mountains, but their magnitude, as referred to the sun, makes this incredible. M. Petit, director of the Toulouse observatory, estimated one he saw in 1860 to be at least 60,000 m. in thickness and 240,000 m. in height, on the supposition of a solar origin. Their forms are somewhat irregular, and at first imperfectly defined, though presently assuming an approximately pyramidal outline. They are sometimes isolated, but commonly project from the edge of the disk nearly perpendicularly, and sometimes toward the extremity bend away at nearly a right angle, just as a vertical column of smoke when it strikes an upper current is drifted off horizontally. Goldschmidt describes having seen, in 1860, half a minute before totality, little gray clouds floating in the corona at some distance beyond the edge of the moon. In an instant the clouds became clear and rose-colored as a pyramidal prominence. At the same eclipse Secchi also saw fine red clouds entirely detached from the borders of the moon. It is noticed that, as the moon moves across the solar disk from right to left, the prominences on the left side shorten and those on the right side lengthen. Otto Struve, in 1860, made careful measurements of these changes, and found that they agreed completely with the rate of the moon's motion. This points to a solar origin of the prominences. If they belonged to the moon, they must have moved along with her, as the eclipse progressed, without alteration. It has been asserted that they correspond in position with the spots, and many observers have inferred accordingly that the two are somehow connected, either as cause and effect, or as common effects of some prior force. But the assumption is unfounded; it is proved that no connection of position exists between them. To explain the prominences, Arago suggested a third envelope, above the photosphere, composed of feebly luminous clouds; and this hypothesis, which accounts for the corona as well, has been very generally adopted. Leverrier, on the other hand, assumes the existence of a kind of roseate matter covering the solid nucleus of the sun, which last he believes to be in a state of incandescence; the spots themselves he supposes to be casual accumulations of this rose-colored matter, and elevations rather than depressions. Lamont of Munich supposes them to be due to vaporous clouds in our own atmosphere, formed by condensation within the cone of the ecliptic shadow. (See "London Philosophical Magazine," June, 1860.) During the brief interval of totality at any one station there is no perceptible change in the form of the protuberances, except as the advancing lunar disk covers or uncovers a portion of their length. But in comparing the drawings made by observers in 1860 on the W. coast of America with those made by observers in Spain, there being a difference of some two hours between the two observations, irreconcilable differences were found in the appearances of the prominences. This fact, allowing that the drawings were in each case accurate, points to the probability that the prominences, if they belong to the sun, as is generally admitted, are of such a nature as to be subject to rapid alterations of form. They are found to be unpolarized, and therefore are not seen by reflected light. It has been thought they might be seen at other times than during eclipses; but Prof. Piazzi Smyth failed to detect them from his lofty observatory on the peak of Teneriffe in 1856. This was to be expected, however, from the high atmospheric illumination through which we necessarily view the sun.—A curious phenomenon known as "Baily's beads," from the observer who first called attention to them, has been repeatedly noticed at total eclipses of the sun, and has puzzled astronomers not a little. It occurs at the instant before and the instant after totality, and consists in an apparent breaking up of the thin visible margin of the sun into bright spots interrupted by black spaces, like a string of beads. The late Prof. Baden Powell thought that the phenomenon arises from viewing the sun's edge between the mountains of the moon with bad telescopes or telescopes out of focus, and partly from the nervous excitement of the eye. In this opinion Prof. Airy, who declares that he has never been able to see the phenomenon, coincides.—Recent experiments with the spectrum indicate the presence in the sun's atmosphere of familiar elements. Fraunhofer had discovered in the solar spectrum a series of dark lines known as "Fraunhofer's lines." Brewster had discovered that a peculiar light could be produced if the rays passing through the prism had first to traverse certain gases. More recently Bunsen had discovered that if, in the flame of a lamp employed to produce the spectrum, the slightest portion of any metal or other element was introduced, there would then appear in the spectrum a different set of lines, having a different color or characteristic for every element; the $\frac{1}{15,000,000}$ part of chloride of sodium could be detected by this means. Applying this elegant mode of qualitative analysis, Kirschof has discovered in the atmosphere of the sun several metals, including sodium, calcium, lithium, iron, &c., which can only exist there in the gaseous state.—How to account for the supply of the prodigious amount of heat constantly radiated from the solar surface offers a boundless field of hypothesis. One theory is that the sun is now giving off the heat imparted to it at its creation, and that it is gradually cooling down; another ascribes it to combustion; a third to currents of electricity; a fourth to the compression of matter from the nebulous state, the condensation going on continually without altering the weight of the body, or affecting necessarily the volume of the enveloping photosphere. (See NEBULAR HYPOTHESIS.) Newton and Buffon conjectured that comets might be the aliment of the sun; and now a somewhat similar theory is much in vogue, viz., that a stream of meteoric matter, constantly pouring into the sun from regions of space very near it, supplies the fuel for the evolution of its heat. This theory was first broached by Mr. Waterston in England in 1853. It appears from careful measurements of Secchi that the different portions of the solar disk, contrary to the opinion of Arago, do not radiate heat in uniform degrees. His tables show that the equatorial regions are twice as hot as the polar. M. Fizeau has proved that the same diminution subsists for chemical radiation. The same is found to be true for the intensity of the sun's light. M. Chacornac has proved that, while the central part of the disk has a uniform brightness for a distance from the centre of about $\frac{3}{16}$ of the radius, the light then diminishes, and the brightness of the centre surpasses that of a point about one half the radius from the centre, by $\frac{1}{13}$ of itself. Mr. De la Rue has succeeded in taking a photograph of the sun, 3 feet in diameter, which exhibits the shading off of the solar light toward the edge of the disk. From a long course of experiments instituted by Prof. Piazzi Smyth, with thermometers buried in the earth's surface at various depths, there resulted an indication of periodical waves of solar heat distributed over a secular swell, whose period is so long that only a small portion of it appears in the time of 17 years. These observations point to the suspicion that the sun belongs to the class of variable stars.—To sum up briefly the best received hypothesis of the physical constitution of the sun: It is a solid body surrounded by 3 atmospheric strata. The first of these is an elastic medium bearing a dense bed of vaporous clouds. On the top of this floats a luminous stratum or photosphere, composed of unconnected phosphoric clouds, and subject to continual fluctuations both from local causes of agitation and from the subjacent vapor acting by its elasticity to burst through the photosphere above it, thus producing the appearance seen as spots in the disk; the faculæ, which are found to be above the general level of the photosphere, are taken to be heapings up of the luminous masses like the crested surges of the sea; this stratum is several thousand miles in thickness. Over all is a third envelope, of imperfect transparency and of great depth, containing in a vaporous condition iron, sodium, lithium, and various other metals. These strata are subject to great movements, which sometimes have the character of uniform progression analogous to our trade winds, and sometimes are violent and resemble in their effects our tornadoes and whirlwinds.

SUN BIRD, the name commonly given to the *promeropidæ*, a family of tenuirostral birds, with a long, slender, and usually curved bill, the nostrils placed at the base and covered with a scale, wings of moderate size, and short tarsi covered with broad scales. They are very brilliant birds, inhabiting the tropical regions of both hemispheres; the sub-family *promeropinæ*, including by far the most species, is confined to the old world, and the *cœrebinæ* to the new. The true sun birds belong to the former, and have a long, slender, curved, and sharp bill, sometimes finely serrated on the margins; the tail is long, the central feathers often exceeding the rest. They are found in the islands of the Pacific and Indian oceans, and on the continents of Africa and Asia; they are the humming birds of the old world, having similar habits and the same brilliant colors, but are of larger size; in morning and evening great numbers are seen hovering and quarrelling over flowers, into which they thrust their long bills in search of insects, spiders, and honeyed juices; the song is said to be agreeable; the natives use the beautiful feathers as ornaments. The genus *nectarinia* (Illig.) contains more than 100 species, mostly African; the nest is usually suspended from a twig, of an elegant form, with an opening on the side protected from the sun and rain by a projecting portico; it is frequently strengthened and covered with spiders' web; the eggs are 2 to 4. For figures and descriptions of some of the most beautiful species, see "Sun Birds" and "Birds of West Africa" in Jardine's "Naturalist's Library." The *cærebinæ* or guitguits have a shorter, broader, and nearly straight bill, and long pointed wings; they are found in tropical South America and the West Indies, having the same habits as the last sub-family; the plumage is very beautiful, but has not the metallic brilliancy of the humming and sun birds. The nests are often suspended from the ends of twigs, with the entrance on the under side, protected by a long funnel or by 2 compartments, in which the young are secure against insects, other birds, serpents, and lizards.

SUN FISH, the common name of the fishes of the diodon family and genus *orthagoriscus* (Schn.). The skeleton is soft and only partially ossified; the body short and round, compressed laterally; the skin rough, covered with mucus, but without spines; jaws undivided in the middle, forming a cutting edge; mouth small, the teeth adapted for bruising sea weeds and soft-bodied animals; the body is truncated posteriorly, looking as if it had been cut off at the dorsal and anal fins and then furnished with a short broad caudal; there are no ventrals, no air bladder, and no abdominal sac capable of distention; the dorsal and the anal fins are more or less united to the caudal; the stomach is small, and immediately receives the biliary canal. The common sun fish (*O. mola*, Schn.) is almost circular in form, and the dorsal and anal project posteriorly, with the caudal between; on each side, near the centre, is a small pectoral, and in front of it the gill opening; the gills are arranged in comb-like fringes; it is also called moon fish and head fish. It attains a large size, 4 or 5 feet in length and 3 or 4 in depth, with a weight of several hundred pounds; the flesh is white, tough, of a disagreeable odor, unfit for food, and remarkably elastic, the last property depending on the great amount of yellow elastic fibre, interlaced in an intricate manner, almost to the exclusion of white fibre and true muscle. It is grayish above and whitish below, with a silvery lustre when alive, and phosphorescent at night, which, with the rounded form, has given rise to the popular name. It is sluggish in its motions, and is often seen asleep at the surface on both sides of the Atlantic; when swimming, it is said to turn round like a wheel, and to be able to float with the head and eyes above the surface; the liver is very fat, and its oil is used for lubricating purposes on board ship, and for sprains and bruises among fishermen. In some seasons it is common in summer in Massachusetts and New York bays, and feeds partly if not principally on medusæ or jelly fishes. There is probably no fish more infested by parasites, internally and externally; the flesh and intestines contain many entozoa, and the skin is studded with crustacean parasites of the genus *pennella*, to which are usually attached numbers of the cirriped *cineras vittata*, and to both many polyp stems; crustacean fish lice (*cecrops Latreilli*) are also generally found, and other parasites on the skin and gills.—The name of sun fish is also commonly given to many medusæ. (See Jelly Fish.)

SUNBURY, the capital of Northumberland co., Penn., on the E. bank of the Susquehanna river, 56 m. N. from Harrisburg, and 134 m. N. W. from Philadelphia; pop. in 1860, 2,200. It has 5 newspapers, a number of churches, and several manufactories and machine shops. The Philadelphia and Erie, the northern central, and Shamokin railroads connect at this place; and the Shamokin dam, 2,783 feet long, just below the town, connects it with the canal on the opposite side of the river. About 150,000 tons of anthracite coal, from the Shamokin region, are shipped from Sunbury every year.

SUNDA ISLANDS, a term formerly applied to the islands of the Indian archipelago which lie around the Java sea, sometimes called the Sunda sea. These islands were divided into the greater and the lesser Sunda islands, the former of which included Java, Borneo, Sumatra, and Celebes, and the latter the chain of islands which extends from the E. extremity of Java to New Guinea.

SUNDA STRAIT, an arm of the sea between the islands of Sumatra and Java, which leads from the Indian ocean to the Java sea. The length of the channel upon the Sumatra side, from Flat point, in lat. 5° 59′ S., to Hog point, is about 65 m.; and upon the opposite coast, from Java Head, lat. 6° 47′ S., to Bantam point, about 85 m. The breadth of the strait where it joins the Indian ocean is about 60 m., and at the end next the Java sea about 20 m.

SUNDAY (Sax. *Sunnan dæg*), the first day of the week, identical with the Roman *dies Solis* (day of the sun). Among Christian nations it is kept as a sabbath, and in remembrance of the Saviour's resurrection. In the early ages of our era the day was devoted as far as practicable to religious worship, which began at daybreak; and as early as the end of the 2d century abstinence from worldly business appears to have been customary. When the Christian religion came to be recognized by the state, laws were enacted for the observance of this day. Constantine ordered in 321 the suspension of all business in the courts of law except the manumission of slaves, and all other business except agricultural labor. Additions were made to this order under various emperors, and in 425, under Theodosius II., games and theatrical exhibitions were forbidden. In

538 the third council of Orleans forbade all labor on Sunday. Many theologians maintain that there is no divine authority for any distinction between Sunday and other days. (See Lord's Day.)

SUNDAY SCHOOLS. From the first organization of Christian churches, the custom prevailed of assembling the children and youth, and those who, though professedly receiving Christianity, were not as yet fully instructed in its doctrines, on the first day of the week, for Christian instruction. The persons thus taught were called catechumens. The "Church and House Book" of the early Christians, as collected by the chevalier Bunsen ("Christianity and Mankind," vol. ii.), gives special directions regarding these catechumens, specifying who were to be received and who rejected, the length of time (3 years) they were to be taught, and the instruction which was to be communicated to them. These catechumens were all expected, after instruction, to receive baptism and become members of the church. During the 4th and succeeding centuries, at least to the 8th, religious instruction was given, at first on the first day of the week, but subsequently on other days, to the children and youth, in the porches of the churches. This custom was eventually given up, and though occasional efforts were made to revive it they were not permanently successful. There is no record of the subsequent establishment of any such schools until 1527, when Martin Luther organized several in Germany. These were not however intended for catechumens, but "for the instruction of children and youth who could not attend the day schools in the art of reading, that they might thereby be better able to read the Holy Scriptures." In the latter half of the 16th century Cardinal Borromeo organized Sunday schools, first in the cathedral of Milan, and subsequently throughout his diocese. In these schools reading and writing were taught, and some religious instruction was bestowed. In the 17th century catechetical instruction of the children was practised in a few parishes of England by the clergymen, and in 1674 also in a church in Roxbury, Mass.; and several schools were established for secular instruction of those who could not obtain the rudiments of education through the week. De la Salle established a number in Paris, and they were also organized in Rome, Vienna, and other cities. At these schools instruction was given in reading, penmanship, arithmetic, drawing, and sometimes even in higher branches. Some of these schools, or others of a like character, are still maintained in the continental cities. Many others were established in the 18th century, but no idea of any thing but local organizations seems to have been entertained until the time of Raikes toward the close of the century (see Raikes, Robert), and for two years his efforts were confined to the vicious street children of Gloucester, whom he had been led to collect into schools from having been personally annoyed by their tumultuous and profane conduct. In Nov. 1783, he first published in his own newspaper, the "Gloucester Journal," the results of his efforts, and recommended the extension of Sunday schools throughout the country. His narrative was copied into other newspapers, and schools were very soon established in all the principal towns. In 1785 William Fox, a merchant of London, who had been for some time engaged in the promotion of week day schools for the instruction of the children of the poor in the Scriptures, becoming acquainted with Raikes's plans, determined to substitute Sunday for week day schools for this purpose, and reported a plan of organization for the "Society for promoting Sunday Schools in the British Dominions." In 1786 it was estimated that 250,000 children were receiving Sunday school instruction in Great Britain. The same year Bishop Asbury of Virginia established the first Sunday school on Raikes's plan in the United States. In 1791 the First day or Sunday school society was established in Philadelphia, Bishop White being its president. Sunday schools were organized in Ireland in 1798, and in Scotland in 1797. In the latter year Samuel Slater established a Sunday school in Pawtucket, R. I., for his operatives. A poor African woman, Katy Ferguson, knowing nothing of Raikes or of Sunday schools elsewhere, established the first in New York city in 1793, for the benefit of the poor street children of the humble quarter in which she lived. It is said that a school for secular instruction on Sunday was organized in New York in 1791, and incorporated in 1796, but it contemplated no religious instruction. Between 1801 and 1804 Mrs. Isabella Graham and her daughter, Mrs. Joanna Bethune, who had become familiar with the English Sunday schools while travelling in Europe, established 3 of these schools in New York at their own expense. From that time they gradually increased in the United States, but the first in connection with a church was at Pittsburg, Penn., in 1809. By 1815 they had extended to most of the countries of Europe and to Ceylon and Australia.—The Sunday school, as instituted by Raikes and his successors, was a very different thing from the Sunday schools of the present day. The teachers were hired; the pupils were for the most part only the very ignorant and often vicious children of the pauper classes; very few of them could read, and the spelling book and hymn book were the principal text books required. Some religious instruction was given, but not in the way of scriptural lessons, as these would not have been understood. The library, as an adjunct to instruction, was not yet introduced. The change from paid to voluntary teachers, and from secular to religious instruction, was made in the United States about 1809, and was simultaneous with the transfer of the control of the schools from individuals to churches. This change took place at a much later period in Great Britain. The system of rewards, by the gift of little books, or in some schools of tickets, a certain number of which entitled the holder to a small money reward, was a common inducement to attendance and study. After the Sunday school society founded in 1785, the next organization for the promotion of Sunday schools was the London Sunday school union, founded in 1803. The Hibernian Sunday school society was founded in 1809, the New York Sunday school union in 1816, and the American Sunday school union in 1824. The objects of this last institution were twofold: the providing suitable text books, primers, question books, picture cards, and a collection of unexceptionable volumes for libraries; and the establishment of Sunday schools, by the agency of missionaries, in the more recently settled regions of the country. Its publications for the first 2 or 3 years were confined mostly to periodicals, spelling books, tickets, reward books, hymns, alphabetical cards, and the like. The Sunday school union led the way in substituting a lending library, attached to each school, for the gift of books; and in 1849 it had published 700 bound volumes of library books, and about as many more question books, alphabetic cards, tickets, maps, and other appliances of instruction. Its catalogue for 1861 gives the titles of nearly 2,000 books, of which 1,003 are suitable for libraries, and its annual expenditure is about $290,000. There have also been organized 6 or 7 denominational Sunday school unions or societies, all of them publishing Sunday school books, and some nearly or quite as largely as the American union. Three tract societies have also issued numerous books intended for these libraries, and 8 or 10 private publishing houses have engaged in the same business. The reprints of English Sunday school books are often issued simultaneously by several of these publishers; but aside from these, the number of distinct works written for Sunday school libraries, published in the United States, is not less than 4,500. The whole number of children attending Sunday schools in the United States in 1861 was estimated to be considerably above 3,000,000. Since 1848 special attention has been given to the establishment of mission Sunday schools, gathering for religious instruction the vagrant and vicious children of the streets of the larger cities into comfortable school rooms, for elementary religious instruction, giving them at the same time food or some articles of clothing. These schools are sustained either by particular churches, by young men's Christian associations, or by city missionary or Sunday school societies. Libraries and the other appliances for instruction are furnished for these, and the teachers who volunteer to instruct them are usually well qualified for their work. The establishment of town, county, and state associations for Sunday school teachers, with frequent meetings for consultation, has greatly improved the character of the instruction in these schools. In Great Britain, Sunday schools have of late years attained to a great degree of efficiency. In England the dissenters, and especially the Methodists, have labored zealously in their promotion, and all classes have aided in the establishment of the mission or ragged Sunday schools. The Wesleyan Sunday schools in Great Britain in 1860 had 494,489 pupils, and the Primitive Methodist schools 180,064. The whole number of children in attendance upon Sunday schools in Great Britain and Ireland in 1861 was about 3,600,000, and of teachers not far from 340,000. The number of different works published by the societies for Sunday schools was over 5,300. In Ireland, the total number of schools reported in 1860 was 2,705, of scholars 233,390, and of teachers 21,302.—In France the Sunday school has never prospered. Some of the Protestant churches have schools, and the efforts of the deaconesses of Strasbourg and Paris have been exerted with considerable success for their organization; but, except for the secular instruction of artisans and others who have no opportunity of study during the week, there are few or none of them in connection with the Catholic churches. In Germany and the Scandinavian countries, under the vigorous efforts of Dr. Wichern and the members of the inner mission, they have within a few years past been extensively established. Italy, though claiming in the person of Borromeo to have been the original home of the institution, has very few Sunday schools, and those few mainly in Sardinia or the states which have been longest annexed to it.

SUNDERBUNDS, a marshy tract of British India, in the Bengal presidency, stretching across the lower part of the delta of the Ganges, between the bay of Bengal and the inhabited parts of the delta, from the river Hoogly to the island of Rabanabad, 158 m., with a breadth of about 75 m.; area, 6,500 sq. m.; pop. very small. The soil is alluvial, and the whole district is cut up into innumerable islands by rivers and creeks, many of them navigable for vessels of considerable size. The woods swarm with tigers and other tropical animals. Salt is manufactured from the sea water to a sufficient extent to supply the demand of the lower provinces of Bengal.

SUNDERLAND, a seaport town and parliamentary borough of Durham, England, situated at the mouth of the river Wear in the North sea, 12 m. N. E. from the city of Durham and 268 m. N. by W. from London; pop. in 1861, 80,-824. The parliamentary borough includes the townships of Sunderland, Bishop Wearmouth, Bishop Wearmouth Pans, Monk Wearmouth, and Monk Wearmouth Shore. The Wear passes through the borough, and is crossed by an iron bridge, high enough for large sailing vessels to pass underneath, which connects Monk Wearmouth with the S. side of the river. The harbor is formed by the mouth of the river, and is protected by piers at the sides extending into the sea, that on the N. being 1,000 feet and that on the S. 1,800 feet in length. The docks upon the S. side of the river have an independent entrance to the sea. Ship building is extensively carried on, amounting in seasons of ordinary prosperity to 60,000 or 70,000 tons. On Jan. 1, 1860, 1,004 vessels of 232,261 tons belonged to the port. In 1859 there were cleared from Sunderland 10,736 vessels, tonnage 1,712,928; and during the same year 2,638,232 tons of coal were exported. The chief manufactures consist of earthenware and glass, anchors, chains, canvas, and all kinds of articles required for fitting out vessels. Nearly 7,000 tons of window glass and 23,000,000 glass bottles are annually manufactured. Sunderland has 4 railway termini which connect with different lines, and afford facilities for intercourse with all parts of Great Britain. The borough returns 2 members to parliament.

SUNDERLAND, Robert Spencer, second earl of, an English statesman, born about 1641, died at Althorp, Sept. 28, 1702. After serving as ambassador to Spain and France, he became in 1679 secretary of state, and engaged in political intrigues, at first opposing and afterward favoring the exclusion bill. In 1681 he went out of office, but was recalled in 1682, and exercised a controlling influence in the administration during the remainder of the reign of Charles II. Under James II. he retained his place as secretary, in 1685 was made president of the council in addition, and in 1687 became a Roman Catholic, much to the delight of King James. Seeing, however, the signs of a coming revolution, he carried on a secret intrigue with the prince of Orange; and in Oct. 1688, he was dismissed by James. On the arrival of the prince of Orange, Sunderland went to Rotterdam, where he was thrown into prison, but was released by order of William. He then went to Amsterdam, again turned Protestant, and after a short residence at Utrecht returned to England, although excluded in the act of indemnity. For some months he led a secluded life, but was thenceforth constantly employed by William III., although at first holding no office. On April 19, 1697, he was appointed lord chamberlain, but on Dec. 25 following suddenly resigned, and spent the remainder of his life at Althorp. During a large portion of his life Sunderland's income from his various offices, from bribery, and from the selling of places, was enormous. He never made any public speeches, his ascendency being due to his insinuating manners and cunning.—Charles Spencer, third earl of, an English minister, son of the preceding, born in 1674, died April 19, 1722. Professing republican principles, he entered the house of commons in 1695 as member for Tiverton, and occupied that position in the 3 succeeding parliaments. In 1705 he was sent to Vienna as envoy extraordinary and plenipotentiary, and in 1707 became secretary of state, from which post he was dismissed in 1710. He was generally regarded as the head of the whig party, and on the accession of George I. he was made lord lieutenant of Ireland, in 1715 lord privy seal, and in April, 1717, secretary of state. In 1720 he introduced Walpole and Townshend into the cabinet. On the investigation of the matters connected with the South sea scheme by the house of commons, Sunderland was implicated in the criminal transactions charged upon the directors; through the influence of Walpole he was acquitted by a vote of 233 to 172, but was obliged to give up office. He still, however, had great influence with the king, and during the remainder of his life was busily engaged in intrigues to effect the downfall of Walpole. By his marriage with the second daughter of the great duke he became progenitor of the present house of Marlborough, their son succeeding as second duke. His magnificent library is preserved at Blenheim.

SUNFLOWER, the common name of a popular annual originating in South America, but long known in cultivation. The same name is applied to several other species having perennial roots, and found indigenous to other parts of the world. Structurally considered, the blossoms of the sunflower are series of many florets inserted upon a slightly convex receptacle or disk, the outer series only having ligulate, petal-like, expanded segments, by which arrangement the flower heads assume a stellar appearance of great size. In the annual sunflower (*helianthus annuus*, Linn.) the terminal flower head is sometimes very large and broad, and presents a bold and showy character, correspondent to the stout, strong, branching stem, and the coarse, cordate, 3-nerved leaves. Usually the color of the florets is a deep orange yellow, though sometimes it is of a pleasing pale sulphur tint. When the entire surface of the disk is covered with ligulate florets, the variety is called double by gardeners. The annual sunflower is only partially admitted into flower gardens, unless where some particular effect is needed by planting it in masses for a background or in isolated clumps. It has been however strongly recommended as a field crop to be employed for economical purposes. The soil most proper for its growth is of a light friable nature, abounding in alkali; but it is considered as peculiarly exhaustive, and in analyses of its leaves and stems large proportions of potash are found. The seeds (*achenes*) contain a great quantity of oil fit for burning in lamps, and nearly as good as olive oil for domestic uses or for the manufacture of soap. Meal and bread are said to be made of them in Portugal; and they are roasted as a substitute for coffee. They are likewise eagerly sought for and eaten by several species of birds, and are recommended for the fattening of poultry. The tuberous sunflower or Jerusalem artichoke (*H. tuberosus*, Linn.) has a slenderer stem, which is round and hairy, and its leaves are rough, long, tapering at base into narrow, wedge-shaped petioles; the flower heads are numerous, and the achenes rather compressed, 4-sided, and wedge-shaped. (See ARTICHOKE.) A dwarf perennial species (*H. multiflorus*), with cordate-ovate, 3-nerved leaves, has been long in cultivation in the flower garden, and serves as a conspicuous object in the hotter and drier summer months, the double variety being mostly seen. The roots require only a slight protection in winter. It has been supposed to be a native of North America, but later investigations have thrown doubt upon the statement. The number of species indigenous to the United States, according to Torrey and Gray, is about 40, and these are geographically distributed from the Atlantic states to the Pacific ocean. On the western prairies the annual growth of stems of some species attains to the height of 15 feet. The sunflowers are usually to be found in dry soils, in woods and on rocky places, from New England and New York westward; and 21 species are cited by Chapman as distributed throughout the southern states.

SUNFLOWER, a N. W. co. of Mississippi, bounded E. by the Yazoo and intersected by the Sunflower river; area, about 1,000 sq. m.; pop. in 1860, 5,019, of whom 3,917 were slaves. The surface is level and swampy, and the soil highly fertile. The productions in 1850 were 33,390 bushels of Indian corn and 1,900 bales of cotton. The Yazoo river is navigable for steamboats during most of the year. Capital, McNutt.

SUNNA, and SUNNITES. See SOONNA.

SUNSTROKE. In warm climates, exposure to intense heat, particularly while the body is exhausted by labor, marching, &c., is a fertile source of disease and death. In severe cases the person falls insensible; he is unable to speak or to swallow; the countenance is commonly dark-colored and injected, the breathing slow and labored, the pulse slow or very small and frequent. Death may occur at the end of a few hours. When the patient recovers, he often remains for a long time feeble, and suffers from headache, confusion of thought, and loss of memory. When death takes place, post-mortem examination shows great congestion of the brain, lungs, and heart.—It was formerly customary to bleed freely in cases of sunstroke, but the results of the practice were by no means satisfactory. Some years ago it was ascertained that all the cases of sunstroke brought into the New York hospital, that had been bled, proved fatal. Cold applications to the head, frictions to the limbs, a mustard plaster to the epigastrium, and, when the patient can swallow, the internal administration of stimulants, is the treatment that affords the most satisfactory results.

SUNSTROKE, INDIAN. See CALENTURE.

SUPERCARGO, a person who accompanies a cargo shipped to a foreign port, and is intrusted with the sale of it there, either as specially directed or to the best advantage, and with the investment of its proceeds in a proper cargo for the home or other market. As the supercargo's authority properly concerns the cargo, it is ordinarily dormant during the voyage, and is called into exercise by arrival at the foreign port; and though for the sake of the cargo and a market the supercargo may sometimes have the authority to determine the destination of the ship, yet he has none to interfere in the navigation of her, or in any respect to usurp the office and functions of the master. The powers and duties of a supercargo are not very specifically regulated by law or usage, but are determined in every instance by the express instructions of the shipper where such instructions are given, as they usually are. The supercargo is simply an agent, and is limited like other agents to the authority vested in him by his principal. Yet, as in the case of some other agents, ship masters for example, by construction of the law new authority is conferred upon the supercargo by the existence and force of necessity; and it has been expressly held that if by any sudden emergency it becomes impossible for the supercargo to comply with the precise tenor of his instructions, or if a literal execution of them would defeat the objects of the shipper and amount to a sacrifice of his interests, it then becomes the duty of the supercargo to do the best he can for the shipper; and his acts done *bona fide* and with a reasonable discretion, in such an exigency, are binding upon the latter. A supercargo, like a master or foreign factor, generally buys and sells in his own name. To cases of this sort, that is to say, when the act may be lawfully done in the sole name of the agent, the law seems to apply the same doctrine, in the event of the death of the principal, as to cases of an authority coupled with an interest; namely, that the authority is not extinguished by the principal's death, but may still be validly executed in the name of the agent; so that the acts of the supercargo in a foreign port, even after the death of the owner of the cargo, and while that event was unknown to him, are binding upon all parties.

SUPERIOR, LAKE (Fr. *Supérieur*, upper), the uppermost of the N. W. lakes of North America, and the largest body of fresh water on the globe. It is included between lat. 46° 30′ and 49° N., and long. 84° 50′ and 92° 10′ W.; greatest length from E. to W. 360 m.; greatest breadth, across its central portion, 140 m.; area, 32,000 sq. m. Its length of coast is about 1,500 m., its mean depth about 1,000 feet, and the level of its surface above the sea 627 feet. The boundary line between Canada and the United States passes from Lake Huron up the river St. Mary's, the outlet of Lake Superior, through the centre of the lower half of this lake, to the mouth of Pigeon river on the N. shore, between Isle Royale and the Canadian coast. This island was allowed to fall on the American side of the boundary in compensation for one of the islands at the mouth of the St. Mary's river. The S. coast of the lake from the outlet to Montreal river belongs to the upper peninsula of Michigan. From this river to the river St. Louis at Fond du Lac the coast belongs to Wisconsin, and thence round to Pigeon river to Minnesota. Toward each extremity the lake contracts in width, and at the lower end terminates in a bay which falls into the outlet, the St. Mary's river, at the two opposite headlands of Gros Cap on the N. and Point Iroquois on the S. Thence to the mouth of the St. Mary's at Lake Huron is about 60 m. The navigation of this river is interrupted 20 m. below its source at the falls of St. Mary, or, as the place is commonly called, Sault Ste. Marie. Here the river descends in a succession of rapids extending ¾ of a mile from 18 to 21 feet, the fall varying with the stage of the water in Lake Superior. Birch canoes run these rapids safely, though they appear full of rocks; they have also been run by one sailing vessel, and a sail boat has ascended them before a strong wind. A ship canal has been constructed past the falls by the U. S. government, so that now the lake is accessible to vessels from the Atlantic ocean. It is only through the outlet that Lake Superior has been reached by any ordinary mode of travel, and while the territory belonged to the Indians the fur companies had exclusive control of this means of access. It is only very recently that communication has been opened by roads from Fond du Lac to the Mississippi, and from the forks of the Ontonagon, on the S. side of the lake, into the settled portions of Wisconsin. The latter road pursues a S. course to Lac Vieux Desert, and then branches, one route turning E. toward Green bay, and the other following the course of the streams that lead into the Wisconsin river. The settlements are separated by about 100 miles of poor lands with no productions of interest excepting pine timber. The region abounds with small lakes, and large districts are said to be covered with bowlders of great size, and so numerous that there is no soil and no vegetable growth. Until the opening of these roads, during the long winter from December to May, the region was entirely shut out except to the mail carriers and occasional travellers, who were able to make on snow shoes the journey of a week through the wilderness that separates the lake from the settlements on Green bay.—Thus remote and isolated, the great lake continued almost unknown nearly to the middle of the present century. Even the settlements of the Indians upon its shores were unimportant, except at Sault Ste. Marie, where they procured abundance of white fish, trout, &c., and at La Pointe, a pleasant island near the upper extremity. They often traversed its waters, however, in their hunting, fishing, and warlike excursions, keeping near the shores in their frail bark canoes. The early Jesuit missionaries visited them in these haunts, and the French *voyageurs* and fur traders were early acquainted with the lake, as they made it a part of their great route to the more distant trading posts of the north-west. (See FUR.) The earliest mention made of the lake is in the account of the expedition of the two missionaries, Charles Raymbault and Isaac Jogues, who, on Sept. 7, 1641, left their mission at the head of the bay of Pentanguishene (in Georgian bay) and passed up in a birch canoe to Sault Ste. Marie. There they found a village of 2,000 Chippewa Indians, and from them heard of the lake beyond, which they called Kitchi-gummi (big lake), greater than either of the lower lakes, and reaching toward the west to the country of their dreaded enemies the Sioux, and to the great prairies, where roamed herds of buffalo and deer. René Mesnard passed up into the lake in 1660, and spent the winter on Point Keweenaw on the S. coast; and in August the next year he was lost in the woods between the head of Portage lake and Lake Superior. Allouez, another missionary, traversed the lake in 1666, and remained two years, visiting its shores as far as Fond du Lac, where he learned from the Sioux of the great river Messepi (Mississippi). In 1668 a permanent mission was established at Sault Ste. Marie by Claude Dablon and Jacques Marquette; and in May, 1671, at a grand council assembled at this place, at which were present officers of the king of France, formal possession was taken of the country for the French crown. In a volume of the *Relations de ce qui s'est passé de plus remarquable aux missions des pères de la compagnie de Jésus en la Nouvelle France*, published in 1672, there is a very creditable map of the lake for the opportunities there had been of preparing it. The occurrence of native copper in this region was noticed as early as 1659–'60; and it is particularly dwelt upon in the *Relation* of 1669–'70. Charlevoix, in his *Histoire de la Nouvelle France* (Paris, 1744), also makes mention of copper, and of its being collected and made into chandeliers, crosses, and censers at Sault Ste. Marie. The first Englishman who spent some time at Lake Superior was a trader named Alexander Henry, who was attracted by the indications of copper mines in the region, and in 1771 employed men to commence mining near the forks of the Ontonagon river, and in 1772 removed them to the N. shore of the lake; the enterprise, however, proved unsuccessful. An account of his experience of 16 years in this part of the country was published in a volume of travels and adventures in 1809. Gen. Cass conducted an exploration through the lake country in 1820 for the U. S. government; and Mr. H. R. Schoolcraft, who accompanied the expedition as mineralogist and geologist, published his observations in a work entitled "Narrative Journal of Travels" (Albany, 1821). Major Long, in returning from his western expedition of 1819–'20, passed along the N. shore of Lake Superior, and the region is noticed in the report by W. H. Keating (Philadelphia, 1824). The United States acquired possession of the territory lying S. of the E. portion of the lake by treaties with the Indians in 1836–'7, and of the remainder as far up as Montreal river in 1842–'3; and immediately afterward surveys and geological explorations were undertaken by the general government and the state of Michigan, followed by a multitude of private and company enterprises set on foot from the eastern and western states with the view of securing the best of the copper mines. For an account of the resources of this region in the useful metals, see COPPER MINES, vol. v. p. 685; IRON, vol. ix. p. 594; and IRON MANUFACTURE, p. 609. Other matters of interest relating to the lake are alluded to in FUR, vol. viii. p. 20.—Lake Superior is supplied by the drainage of an extensive territory through a multitude of rivers, none however of large size. High lands in general lie near the coast, the long slopes from which are directed away from the lake and the short slopes toward it. The rapid fall prevents the navigation even by canoes of most of these streams, but provides excellent water power, which is almost everywhere available. At the head of the lake the St. Louis enters from the N., where its waters, navigable only by light canoes, interlock with those of the Mississippi and with those that flow into the Lake of the Woods. Montreal river, which divides Wisconsin from the upper peninsula of Michigan, is navigable by canoes only in the places between its numerous falls. The Ontonagon, the most important of the rivers, is entered by the vessels that navigate the lake, and is ascended by flat boats up to the range of the trap hills that contain the copper mines, 20 m. above its mouth. This river with its branches drains an area of about 1,300 sq. m. Its E. branch heads near a branch of the next largest river, the Sturgeon, which flows into Portage lake at the base of Keweenaw point. This small lake, which almost cuts through the point, is by improvements at its outlet rendered navigable for the lake boats, and they pass up close to the important mines worked upon its banks. The rivers on the N. side flow through a rough granitic country, and are interrupted by numerous falls, many of which are highly picturesque. The coast of the lake is for the most part rocky, and on the N. side is much indented by deep bays surrounded with high rocky cliffs, back of which the country soon rises in bleak and dreary mountains. Numerous islands are scattered about this portion of the coast, and many of them rise precipitously to great heights directly up from the deep water. Some present castellated walls of basalt, and some rise in granitic peaks to various elevations up to 1,300 feet above the level of the lake. Nowhere upon our inland waters is the scenery so bold and grand as on the N. shore of Lake Superior. The irregularities of the coast with the general depth of water here afford numerous good harbors, which however in this unfrequented region are as yet of little service, while on the opposite coast such places of refuge are much wanted.—The largest island in the lake is Isle Royale, 20 m. from the N. shore and 45 m. from Keweenaw point. It extends N. E. and S. W. 45 m., with a breadth of 8 m., and is made up of parallel ridges of amygdaloidal trap, greenstone, and sandstone, following the same course with the island, and at the N. E. extremity running out in long fingers into the lake. The harbors on the sides are elongated inlets, due to the same geological structure; and the same may be said of those on the opposite shore of Keweenaw point. The determination of the coast lines by the wearing action of the waters upon rocks of different degrees of hardness is remarkably exemplified everywhere along the shores of Lake Superior. The great waves, often heavily charged with ice and driven by the terrific storms of this northern region, batter with tremendous force the hardest rocks, and in the long succession of ages scoop out the softer strata, following them up the narrow lines of their bedding, or excavating them from their more irregular repositories, leaving the high cliffs worn into strange forms suggestive of rude architectural resemblances, and honeycombed with caves, into which when the lake is still boats may enter. Such is the character of the precipitous walls of red sandstone on the S. coast, famous in all the earlier accounts of the lake as the "Pictured Rocks." They stand opposite the greatest width of the lake and exposed to the greatest force of the heavy storms from the north. The effect of the waves upon them is not only seen in their irregular shapes, but the sand derived from their disintegration is swept down the coast below and raised by the winds into long lines of sandy cliffs. At the place called the Grand Sable these are from 100 to 300 feet high, and the region around consists of hills of drifting sand. Similar exposures of red sandstone with sandy beaches and cliffs in their vicinity form portions of the coast above Keweenaw point. The point itself is formed of ridges of amygdaloidal trap, greenstone, and sandstone, like those of Isle Royale, which toward the S. W. gradually recede from the coast. At the Porcupine mountains, 20 m. above the Ontonagon river, the same formations again appear in bold hills rising near the lake to more than 1,000 feet in height, and other groups of the same rocks continue to be met with in proceeding to Fond du Lac. The straight line of coast thence to Pigeon river, running with the course of the stratification, is composed of metamorphic slates and sandstones with interstratified traps and porphyries. Dikes of greenstone frequently cut across the strata; and comparatively recent deposits of red clay, marl, and drift occasionally interrupt the superficial continuity of the older formations. The argillaceous slates, hornblende, and granitic rocks that form the hills back from the shore come out to the lake, and make up the mountainous coast about Thunder bay and Neepigon bay on the extreme N. of the lake. Veins of copper ores are frequent among the rocky islands of this vicinity, and on one known as Prince's island the ores were found to be highly argentiferous. No mines, however, are now worked on the N. shore. Further east, the rocks on this side are more of granitic character. Headlands of granite and basalt are met with on the S. coast also between the Pictured Rocks and Keweenaw bay. Michipicoten island, belonging to Canada, is of greenstone, and contains native copper and silver; but the attempts to work the mines have not been successful. The island is 18 m. long, and the hills upon it rise to the height of 800 feet. Of the islands on the S. side, one of the most important is Grand island, just above the Pictured Rocks, a fertile tract of land covered with sugar maples, birch, and other hard woods, and now partly under cultivation; it makes a fine harbor on its S. side. Between it and Keweenaw point, and hardly within sight of land, is a remarkable rock of metamorphosed sandstone, standing about 4 feet above the water, and occupying a space of about 50 by 20 feet. Dangerous shoals extend from it N. N. E. and N. N. W. in parallel ridges with deep intervening hollows. Near the upper extremity of the lake is the group of islands called the Apostles, upon the largest of which, Madeleine island, is the old Indian settlement and trading post of La Pointe. Near it on the mainland is the new settlement of Bayfield, and above at Fond du Lac the new town of Superior. The other settlements of importance are those on the range of the copper and iron mines, and at their outlets at the mouth of the Ontonagon, Eagle River, Eagle Harbor, and Copper Harbor on Keweenaw point, and the town of Marquette above Grand island. A considerable population is supported on the shores of Portage lake, where several very rich copper mines are worked in the trap range which crosses this lake. At the head of Keweenaw bay is an old Indian settlement and mission called L'Anse; and on Thunder bay was formerly another at the Canadian trading post called Fort William, on the route by the Kaministiquia river to the more remote posts to the N. W.—The country immediately bordering Lake Superior is for the most part either too sandy or too rocky for fertility; but a few miles back on the S. coast, especially on the trap ranges, the soil is deep and rich, and supports fine forests of hard maple, birch, red oak, ash, hemlock, and in the lower grounds white cedar, spruce, tamarac, &c. White pine is scattered through the woods everywhere, and is very abundant about the heads of most of the rivers. On the N. shore the forest growth is of the inferior sorts of wood, and the trees are mostly stunted. On the islands the birches, poplars, spruce, fir, and cedars run up in long slender poles, and the rocks are often covered deep with moss, making the travelling over them dangerous from the hidden cavities. Multitudes of bushes spring up where the wooded hillsides have been burned over, and the most abundant everywhere among them is the wild raspberry. Its fine fruit may sometimes be gathered on the N. shore, together with wild currants, gooseberries, strawberries, whortleberries, blueberries, mountain cranberries, wild cherries, and other fruits, all ripening together in the short summer of this high northern latitude. The crops that thrive best upon the farms about the mines are potatoes, turnips, hay, and oats. The natural meadows about the small lakes and others produced by old beaver dams make excellent pasturage as well as mowing, and cattle find good grazing also during the summer by ranging through the woods. Corn does not mature, but most garden vegetables, as cabbages, beans, peas, beets, carrots, cucumbers, &c., thrive luxuriantly. Though the summers are short, the days are long, and vegetation under the continued sunlight comes forward with surprising rapidity. The deep covering of snow, which lasts almost from the first fall to the opening of spring, keeps the ground warm and mellow, in excellent order for the next crop. It rarely freezes under this protection, and potatoes often renew themselves without replanting; they have been found growing as if wild in a swamp near the mouth of the Ontonagon, in land that could not have been planted for 10 years or more. There are few good roads through the country, the travelling in the summer being chiefly by water; in the winter the underbrush is mostly covered by the snow, and as this falls nearly every day and freezes every night, a hard crust is found almost everywhere upon which those who are accustomed to snow shoes pass easily through the woods in any direction. The country contains little game; deer are scarce, and the animals hunted for their furs, as the beaver, otter, marten, and silver fox, have been almost exterminated. Wolves are rarely encountered, and the largest animal often met with is the porcupine. Partridges are abundant, wild pigeons also in some seasons, and ducks upon the rivers. The lake contains many varieties of excellent fish, some of which, as the white fish, are better than some kinds found in the lower lakes. Lake trout are caught of large sizes, but they are inferior to the rarer siskiwit and muscalonge. Suckers are abundant, and brook trout are common in nearly all the rivers and brooks.—The mineral productions of the lake have been stated in the articles COPPER MINES and IRON MANUFACTURE, already referred to, up to the time when the volumes containing those titles were printed. The statistics down to the end of the year 1861 are presented in the following tables from the circulars of Messrs. Dupee, Beck, and Sayles of Boston:

Years.	Tons.	Average price per ton.	Value.
Total production of ingot copper to close of 1857...	18,954	$500	$9,477,000
Shipments of 1858............	3,500	460	1,610,000
" 1859............	4,200	460	1,932,000
" 1860............	6,000	420	2,520,000
" 1861............	7,400	420	3,108,000
Total	40,054		$18,647,000

The production of the several mines for the last 3 years in rough copper as shipped was as follows, the weights of the barrels being deducted, and the results given in tons of 2,000 lbs. and tenths:

Keweenaw district.	1859.	1860.	1861.
Amygdaloid, late Connecticut	..	..	68.0
Central	172.8	78.6	162.0
Clark	5.6	7.2	..
Connecticut	24.0	5.8	..
Copper Falls	329.4	328.0	272.0
Eagle River	6.0	..	..
Garden City	..	..	10.8
North American	8.7	..	88.9*
North-West	78.8	108.5	62.8
Phœnix	32.0	31.2	46.9
Pittsburg and Boston	1,254.5	1,357.0	1,496.5
Summit	4.0	..	..
Total	1,910.8	1,910.8	2,151.9
Portage Lake district.			
Albany and Boston	..	..	4.2
C. C. Douglass	..	24.0	..
Isle Royale	241.8	458.6	726.0
Franklin	204.7	267.0	855.0
Hancock	..	7.2	56.0
Huron	7.4	78.0	105.0
Mesnard	.6	..	..
Pewabic	784.4	1,368.8	1,129.0
Portage	8.7	..	42.0
Quincy	336.0	866.0	1,791.4
Total	1,583.1	3,064.6	4,708.6
Ontonagon district.			
Adventure	139.4	29.7	3.3
Aztec	15.3	4.9	..
Bohemian	3.0	..	7.6
Evergreen bluff	27.0	41.9	70.6
Flint Steel river	..	..	1.5
Hamilton	.7	7.9	..
Knowlton	..	..	11.4
Mass	12.3	..	..
Minesota	1,623.6	2,183.4	1,880.4
National	323.2	727.8	948.0
Nebraska	9.8	26.4	7.8
Norwich	22.0	..	..
Ogima	35.4	..	9.7
Ridge	27.8	22.0	31.0
Rockland	347.0	552.7	469.0
Superior	1.7	14.0	39.7
Toltec	9.4	..	2.2
Total	2,597.6	3,610.7	3,476.7
Porcupine mountains	..	20.5	..
Sundry mines	..	7.6	..
Grand total	6,041.0	8,614.2	10,337.2

The annual shipments of rough copper, according to the official statements made to the Michigan legislature, have been as follows:

1845, lbs.	1,300	1853, tons	1,458
1846, tons	29	1854, "	2 300
1847, "	239	1855, "	3,196
1848, "	516	1856, "	5,726
1849, "	753	1857, "	5,759
1850, "	640	1858, "	5,896
1851, "	872	1859, "	7,245
1852, "	887	1860, "	9,200

The shipments of iron ores from the lake have been as follows, commencing in 1855:

1855, tons	1,457	1859, tons	30,000
1856, "	11,597	1860, "	150,263
1857, "	26,184	1861, "	50,000
1858, "	30,827		

In 1861 only about 3,000 tons were shipped after the middle of September, all the vessels having been withdrawn to go into the grain trade. The production of pig iron in 1858 was 2,000 tons; in 1859, 6,000; and in 1860, 6,500. In 1861 there were 5,289 tons shipped, and the product, it is thought, was larger than in 1860. The average value of the ore delivered on the docks ready for shipment is about $3 per ton gross, and of pig iron about $22.50 per ton.

SUQUAMISH, a new W. co. of Washington territory, bordering on the Pacific, and intersected by the Sawamish river; area, 500 sq. m.; pop. in 1860, 162.

SURAT, a walled town of British India, in the presidency of Bombay, capital of the province of Guzerat, situated upon the left bank of the river Tuptee, 20 m. from its mouth in the gulf of Cambay, and 160 m. N. from Bombay; pop. 180,000. There is an English church, several handsome mosques and temples, numerous Hindoo and other schools, and an extraordinary institution, called the Banian hospital, founded and richly endowed by the Jains, for the treatment and cure of diseased animals of all descriptions.—Surat is a place of great antiquity, and is mentioned in the ancient Sanscrit poem, the *Ramayana*. When the Mohammedans ruled Hindostan it was their chief port of embarkation on their pilgrimage to Mecca. The Portuguese began to trade with Surat about 1561; and in 1606 the English obtained commercial privileges from the emperor Jehanghir. In 1612 they established a factory, and 3 years afterward it became their chief station on the W. coast of India, and remained so till 1686, when it was removed to Bombay. In 1796 the population was estimated at 600,000, and it had then greatly declined in consequence of the loss of its trade. In 1800 the British took the entire government from the nabob, allowing him to retain his rank, and agreed to pay him and his heirs 100,000 rupees ($50,000) annually, and 20 per cent. of the surplus revenue, after deducting the expenses of collection.

SURETY, in law, a person who binds himself to fulfil, either wholly or in part, the engagement of the principal obligor. For those cases in which the surety expressly assumes the obligation technically known as a guaranty, or in other words engages for the performance of another, see the article GUARANTY. When two parties join in making a promissory note, as matter of strict law, both promisors are equally liable; but if it be shown that, as matter of fact, the note was given at the request and for the sole benefit of one of the makers, he is, equitably at least, primarily responsible for payment of the whole; or in other words, he is the principal in the obligation, while his co-signer is the surety. So if a sale be made to two on the faith of their joint promise of payment, the legal obligation of the buyers is the same whether the promise was given for the common advantage, or was designed only to enable one to make the purchase by assisting him with the credit of the other. But if the purchase were in fact made under the latter condition, the effect is in equity to raise the relation of principal and surety, and to throw upon the former the whole burden of the performance. If, then, in case either of the note or the sale, the surety in fact be compelled (as, according to the tenor of his obligation, he obviously may be) to pay the whole, equity declares that he is entitled to complete reimbursement from the principal in fact, or in other words, from him who gets all the benefit and is therefore really the responsible party. Equity also declares that, in order to secure this reimbursement, the surety is entitled to the benefit of all the security which either the rules of law or the express acts of the parties have given to the obligee or creditor; and if, by any negligence or other acts, the obligee defeat these rights of the surety, he forfeits his right of action against him. It may be proved in a common law court, by any competent evidence, that in a contract executed by two, one was principal and the other was surety, even though the contract neither disclose nor suggest any such thing. If the creditor or obligee is fairly informed of the relation of principal and surety existing between the parties, he is bound to take care that no act of his shall destroy or lessen the surety's right of indemnity from the principal debtor. If therefore he declare that he will look solely to the principal for payment, so that the surety is induced to omit taking security from the latter; or if he tell the surety that the debt has been paid so that he relinquish to the principal his security; the surety will be in both cases discharged from his obligation to the obligee. But though the debt be already due, the mere inaction of the creditor to pursue his remedies against the principal will not discharge the surety, nor will positive indulgence to the principal have this effect; but if the delay be granted in pursuance of any binding agreement with the principal, so that the surety cannot pay the debt and then proceed for indemnity against the principal, the creditor's act releases the surety. The mere suspension of proceedings once commenced against the principal does not discharge the surety; for as no positive advantage has been gained against the principal, the surety has no more ground for complaint than he has in the case of mere inaction. But as the surety is entitled to the benefit of all securities given by the principal, he is discharged if the creditor's inaction or negligence have rendered these securities valueless. So, when a creditor had surrendered to the principal debtor a horse and gig belonging to the latter, which he had held as security for the debt, it was decided that his act barred any proceeding against the surety. In short, though the creditor is not bound, so far as the surety is concerned, to pursue the ordinary legal remedies against the principal, yet he is bound, in respect to all remedies given him by way of pledge or security or by other act of the parties, to hold or pursue them diligently in behalf of the surety; and if he relinquish any such remedy without the knowledge or against the will of the surety, he shall lose his claim against the latter to the extent of the right surrendered. It has been held in a leading case in New York, that if an obligee or holder of a note, who is requested by a surety to proceed without delay to collect the money of the principal, who is then solvent, omits to proceed against the principal, and the latter afterward becomes insolvent, the surety will be exonerated at law. But in many of the states this doctrine has been rejected, and even in New York it has been partially disapproved. The general ground of objection to it is that, though a surety may, through a court of equity, compel a creditor to prosecute his demand against the principal, mere notice or request *in pais* to do so gives the surety no claim to be discharged. On the ground that there was no court of chancery in Pennsylvania, it was held there that the surety's request must suffice to release him, as otherwise there were no means of enforcing his rights. In some of the states, however, the rule adopted in the leading case in New York has been embodied, with some restrictions, in express statutes.

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* From tributors. The mine now belongs to the Pittsburg and Boston company.

SURF BIRD (*aphriza virgata*, Gray), a wading bird of the plover family, and subfamily *cinclinæ* or turnstones. The bill is about as long as the head, with vaulted obtuse tip and compressed sides; wings long and pointed, with the first quill the longest; tail moderate and even; tarsi long as middle toe, robust, with small irregular scales; toes long, free at the base, sides of anterior ones margined, and hind one elevated, slender, and partly resting on the ground. It is about 10 inches long, with the wing 7; dark brown above, lighter on the wing coverts, with white spots and stripes on the head and neck; upper tail coverts and basal half of tail white, the latter terminated with brownish black; under parts white, tinged with ashy in front, each feather having a brownish black crescent. It is found on the Pacific coast of North and South America, and in the Sandwich islands, migrating from northern to temperate regions in winter and back again in summer. It is usually seen on the edge of steep rocks, among the retreating waves, searching for small mollusks and marine animals, allowing the surf sometimes to dash over it, whence the common name; its flight is short, with a quick and jerking motion.

SURGEON. See PHYSICIAN AND SURGEON.

SURGEON, a bird of the stork family. See JACANA.

SURGERY, or CHIRURGERY (Gr. χειρ, the hand, and εργον, labor), that department of the art of healing which appertains to the diagnosis, prognosis, and treatment of the class of diseases which require manual or instrumental measures for their cure. The sphere of surgery is more limited and at the same time more accurately defined than that of medicine. Surgery divides tissues or parts improperly united, and unites those which have been divided when they should remain in union; separates whatever has become dangerous or inconvenient to the patient; removes foreign bodies, or parts of the body which from disease or loss of vitality have become foreign, whenever they exert a hurtful influence on the animal economy; restores to their cavity or replaces in their normal position portions of the body which have become displaced; checks the loss of blood from wounded or divided blood vessels; reduces inflammations, or removes the purulent or phlegmonous matter which may have been deposited by them; repairs and corrects deformities and distortions; and effects the replacement of lost tissues. Its means of accomplishing these results are the hand, lint, bandages, and apparatus of various kinds, cutting, crushing, and probing instruments, catheters, bougies, sounds, forceps, specula, &c., and the various forms of cauteries, direct and indirect, liquid and solid.—The earliest surgeons of whom there is any record were the Egyptian priests. Of their skill in embalming the bodies of the dead there is ample evidence, and Kenrick says that "on the walls of the ruined temples of Thebes, basso-rilievos have been found displaying surgical operations and instruments not far different from some in use in modern times." According to Herodotus, we owe to them the use of the moxa and the adaptation of artificial limbs. Among the Jews in their early history there is but little evidence of surgical skill, and that little is confined to the priests. Circumcision was indeed skilfully performed, but this required little surgical ability; and in the treatment of wounds and fractures, even at a late period (2 Kings i. 2), the more skilful Phœnician priests seem to have been preferred. In Greece, surgery is as ancient as the mythic period of its history. Chiron the centaur, born in Thessaly, and skilful in the application of soothing herbs to wounds and bruises, is the legendary father of Greek surgery. But Æsculapius, the son of Apollo, said by some to have been the pupil of Chiron, though others call him his predecessor and superior, won the highest fame in that early time for surgical skill. He is said to have been deified on account of his wonderful success about 50 years before the Trojan war. Temples were reared for his worship, which became the repositories of surgical knowledge, at Epidaurus, Cnidus, Cos, and Pergamus. Homer has immortalized his two sons, Podalirius and Machaon, the companions of Agamemnon in the Trojan war (about 1192 B. C.), where they rendered essential service in healing the wounds of the Grecian heroes. Venesection was practised by Podalirius, while Machaon possessed the greater skill in the treatment of wounds. Their knowledge, however, seems to have been limited to simple operations like the removal of darts, the checking of hæmorrhage, and the assuaging of pain by soothing applications. Of the treatment of fractures they appear to have been entirely ignorant, for in these Homer invokes Apollo only, never calling on the surgeons for aid. For 600 years after the Trojan war we find little said of the surgeon's art. The Asclepiades, or descendants of Æsculapius, retained the monopoly of this as well as medicine in their family. They had established in this period 3 schools of medicine, at Rhodes, Cnidus, and Cos. Pythagoras, about 600 B. C., established at Crotona a new school of medicine, in which his peculiar philosophy was probably applied to the art of healing; among its early pupils was Damocedes, eminent as a surgeon, who when taken captive by the Persians reduced the dislocated ankle of Darius, and removed or in some way cured the cancerous breast of his queen Atossa, after the Egyptian physicians had failed. The want of anatomical knowledge, no dissections being allowed, was a fatal bar to any considerable progress in surgery. Hippocrates more than any of his predecessors advanced surgical treatment; he reduced dislocations and adjusted fractures, clumsily it is true, and with great pain to the patient, but with some success; he used the trephine, many times unnecessarily; he applied the forceps in accouchement, made incisions into the kidney for the removal of calculi, performed amputations, perforated the cavity of the ribs in empyema and hydrothorax, and used cauteries of all sorts, moxas, red-hot irons, wood saturated with oil, &c. He also made use of lints and issues, and operated for *fistula in ano*. Interdicted from human dissection, he practised the dissection of the ape tribe as nearest to man in anatomical structure, and thus obtained much knowledge. For more than 100 years after the death of Hippocrates we meet few names of note in surgery. Diocleso Carystus, one of the Asclepiades, obtained some notoriety for his skill in wounds of the head; and Praxagoras of Cos, the last eminent name among the descendants of Æsculapius, treated quinsy and other diseases of the throat by incision and excision, and made incisions into the bowels where other means failed to remove obstructions. The founding of the Alexandrian school under Ptolemy Soter in 300 B. C. was another important epoch in the advance of surgery. Herophilus and Erasistratus, the two great leaders of the medical school of that university, if it may be so called, were eminent both as physicians and surgeons; with them commenced the practice of human dissections. The extirpation of the spleen, and the application of remedies direct to scirrhosities and tumors of that viscus and of the liver, were among the bold operations of Erasistratus. To him also belongs the invention and application of the catheter in cases of retention of urine. The pupils of these eminent surgeons invented bandages of peculiar forms, and introduced the tourniquet and contrivances for reducing dislocations of the femur. One of them, Ammonius, employed an instrument for lithontriptic purposes, anticipating Civiale's process.—Rome in the first 600 years of its history produced no surgeon of note. One Archagathus, who, with a courage worthy of a profounder knowledge, attempted with ill success some operations in the consulates of Lucius Æmilius and Marcus Livius, was driven from the city by an enraged populace. Asclepiades of Bithynia (96 B. C.), though attaining some reputation as a physician, soon abandoned surgery from fear of the populace. We owe to him however the recommendation of acupuncture in ascites, general and local bleeding, and laryngotomy in some affections of the throat. Celsus was the greatest of the surgeons of ancient Rome, and his observations on injuries of the head, on cataract, on the ligature of wounded arteries, hernia, lithotomy, fractures and dislocations, amputations, and carbuncle, are all fully accordant with our present knowledge on these subjects, at least in the principles laid down. Aretæus, the first to use the cantharides blister, Heliodorus, Antyllus, and Rufus the Ephesian, all of whom flourished between A. D. 50 and 120, added to the surgical knowledge of the time new views of the treatment of injuries of the head, the resort to arteriotomy instead of venesection in sudden emergencies of inflammatory action, bronchotomy in some acute diseases of the throat, the radical cure of hydrocele by free incision of the parts, and a more thorough investigation of diseases of the kidneys and bladder. Galen devoted more attention to medicine than surgery, but his observations on hernia, on luxation of the femur backward, and on the application of the trephine to the sternum in empyema, are of importance. In the early period of Christianity surgery languished; the early Christians opposed dissection as strongly as the pagans, and by attributing the power of healing wounds to martyrs and their relics discouraged all efforts at improvement in surgical science. The first eminent name among the surgeons of the dark ages is Aëtius (500 to 550), whose surgical writings are numerous and valuable. He practised scarification of the extremities in anasarca; operated for aneurism; endeavored to dissolve urinary calculi by internal remedies; removed hæmorrhoidal tumors with the knife; discussed with great ability the subject of hernia and all the operations for it; and wrote largely on encysted tumors, diseases of the testes, injuries to nerves and tendons, and diseases of the eye. Mingled with his numerous valuable observations, we find, however, evidence of his faith in amulets, charms, &c., to avert or cure disease. Alexander of Tralles, a younger contemporary of Aëtius, wrote treatises, now lost, on diseases of the eye and on fractures, which were highly commended for their originality by some of his successors. Paulus Ægineta, in the 7th century, was a surgeon of eminence and considerable originality. His 6th book has been considered by many as the best body of surgical knowledge prior to the revival of letters. He recommended topical in preference to general bleeding, as more effective in reducing local inflammation; resorted to copious venesection to accelerate the painful descent of calculi through the ureters; opened internal abscesses with caustics; defined the points for performing paracentesis in ascites; made his incision in lithotomy on one side of the raphe instead of the centre as Celsus had recommended; urged the necessity of small incisions into the bladder; described with accuracy and treated with success many of the numerous varieties of aneurism; performed extirpation of the mammæ by crucial incision; practised both laryngotomy and tracheotomy, the latter as a means of carrying on respiration during occlusion of the larynx; treated of fractures of the patella; and was the originator of the obstetric operation of embryotomy.—The Arabian physicians, who rose into distinction as those of the West declined in reputation, did little for surgery. Rhazes (852–932) described for the first time *spina ventosa* and *spina bifida*, cauterized the wounds from the bites of rabid animals, opposed the use of the knife in cancer except when limited and when the whole tumor could be removed, and gave a clear and satisfactory description of the treatment of hernia. Avicenna (980–1036) introduced the flexible catheter and the operation of depression for cataract. Albucasis (died 1122) was extremely partial to the actual cautery, introduced an instrument for the cure of *fistula lachrymalis*, invented the probang, and in wounds of the intestine practised union of the divided parts by suture with success. Avenzoar, about the beginning of the 12th century resident at Seville in Spain, wrote on surgery, but added little that was new to the science.—In Catholic Europe medical practice and what of surgery remained was mostly in the hands of the clergy until, by the edict of the council of Tours in 1163, they were interdicted from all surgical practice. The Jews were at this period and for a century or two later in high repute as physicians, but they seem to have had a dislike to surgery. Guy de Chauliac, a priest, compiled from the Greek and Arabian authors the earliest work of modern times on surgery, but with very little judgment of what was worth retaining. For two centuries and more surgery was mainly in the hands of the illiterate barber surgeons. The revival of surgical science dates from the appearance of Vesalius as a teacher of anatomy in Italy, followed soon after by Fallopius and Eustachius. Surgery was then for the first time put upon a sound and scientific basis, that of careful dissection, and Ambroise Paré, a French army surgeon who had educated himself in anatomical science, was the first of its great lights. He was surgeon successively to four kings of France, and was attached to the French armies as surgeon-general down to 1569. To him we owe the revival and improvement of the practice of tying the arteries after operations or wounds, instead of cauterizing them with hot iron or boiling oil. His treatise on gun-shot wounds, though the first ever written on that subject, is a work of great value. The pupils of Paré added little lustre to their master's name; but in Italy at the close of the 16th century Fabricius ab Aquapendente flourished at Padua, and his *Opera Chirurgica*, the first really valuable treatise on surgery of modern times, passed through 17 editions. He was the preceptor of Harvey. Wiseman, sergeant surgeon to Charles II., was the first eminent surgical writer and practitioner in England. His recommendation of immediate amputation in military practice, when the preservation of the limb was impossible, has been followed from that time to the present. He left 8 treatises on surgery, which are not without value even at the present day. The flap operation in amputation is claimed for James Young, an English surgeon contemporary with Wiseman, and also for two French surgeons, Verduin and Sabaurin, of the same period. In Germany during this century, Hildanus, Scultetus, Purmann, and Heister were the principal surgical writers and practitioners. The last named, a professor in the university of Helmstedt, was the author of a system of surgery which has been translated into most of the languages of Europe, and is still regarded as an authority. The tendency of German surgery at this period was to daring and dangerous operations. In Italy the principal names of note were Taliacotius, the originator of restorative surgery in Europe; Cæsar Magatus, who greatly simplified the treatment of wounds; and M. A. Severinus, who banished the salves and plasters which in Italy had usurped the place of operations. The 18th century witnessed a still greater advance in the science, resulting alike from the profound anatomical and physiological attainments and the brilliant genius of the surgeons of the period. In England, Percival Pott, the best operator of his time, the reformer of the abuses of the actual cautery and the potential escharotics, the discoverer of the form of caries of the vertebra known by his name, and the most judicious writer of modern times on fractures, amputations, injuries of the head, and diseases of the spine; John and William Hunter, the former the greatest master of the principles of surgery in the profession; Cheselden and Douglas, both famous as lithotomists, and the former remarkably successful; Sharp, the able author of the "Critical Inquiry into the State of Surgery;" and the Drs. Monro, father and son, are among the great names of the surgical profession. In France flourished Lapeyronie, at whose instance Louis XV. in 1731 founded the academy of surgery; Jean Louis Petit, the greatest French surgeon of the 18th century; Ledran, Garangeot, and the illustrious Desault, the originator of clinical surgical instruction and the inventor of numerous admirable apparatuses for the treatment of fracture; with a host of others hardly less famous. Among the celebrated surgeons of other European countries were Molinelli, Morgagni, Scarpa, Bertrandi, and Moscati in Italy; Albinus, Deventer, and Camper in Holland; and Platner, Röderer, Callisen, Rambilla, Theden, and Richter in Germany. During the 18th century the ligature of aneurismal arteries of large size, the treatment of hernia and *fistula in ano*, the cure of *fistula lachrymalis*, and the skilful management of dangerous and difficult parturitions, were the most important branches of surgery in which there was a material advance from the preceding century; the proper construction of instruments also received great attention. The 19th century has, however, done more for the improvement of this science than all the centuries which have preceded it. In England, Abernethy, Sir Astley Cooper, Liston, and others of the highest reputation have passed away, and others hardly less eminent remain; in France, Dupuytren, Roux, Lisfranc, and Larrey had no superiors either in the past or present; and in the United States, where surgery up to the period of the revolution hardly had an existence, and the surgeons who became eminent during the war did so rather from the force of genius than from the instruction they had received, the science has won its highest trophies in the relief of human suffering. The objects to which the attention of the skilful surgeons of the present century has been directed have been not so much the invention or origination of new and daring operations, though the profession has not been wholly free from the charge of indulging in "heroic" surgery, as the simplification of its processes, the perfection of the instrumentalities used, the introduction of anæsthetics, and the avoidance of capital operations wherever the desired result can be obtained by a less brilliant mode of treatment. The following may with propriety be particularized as among the improvements of the age in surgery: resection of the bones at the joints; the preservation of the periosteum and consequent development of new bone; partial amputations of the foot; amputations at the thigh and shoulder joint; the ligature of arteries within the trunk and immediately at their departure from it; the resection and removal of portions or even the whole of the upper or lower jaw; the operations for cleft or deficient *velum palati* or palatine vault; the opening by longitudinal section of the air passages at different points to avoid asphyxia; the resection and extirpation of the uterus, of the ovaries, and of the lower portion of the rectum; the adoption of water dressings in the treatment of wounds; the introduction of the silver suture; the adoption of the gum and *papier maché* splints in fractures; the processes for remedying disunited fracture; the substitution of milder means for the trephine in all except the most serious cases; the improved treatment of ulcers and abscesses; the cure of the most formidable aneurisms by the ligature of the carotid, subclavian, axillary, humeral, and external and internal iliacs; the treatment of varicose veins; the successful reduction of hernia; the successful treatment of calculus both by lithotomy and lithotrity, in consequence of the great improvement in the processes and instruments of the latter operation; the treatment of stricture, of injuries and diseases of the trachea and larynx, and of rectal diseases; the diagnosis and treatment of tumors, whether encysted, fatty, vascular, or malignant; the treatment of hydrocele; the cure of strabismus; the restorative processes, by which the nose, lip, &c., are re-formed from adjacent tissues; and the treatment of harelip and of club-foot. Military surgery has made great advances during this century.

SURINAM. See Guiana.

SURINAM, a river of Dutch Guiana, which rises in the mountains on the S. frontier, flows through the centre of the colony, and falls into the Atlantic 16 m. below Paramaribo after a course of about 300 m. It has several tributaries, and is navigable for large vessels about 80 m. from its mouth. The banks of the Surinam are generally wooded, and between Paramaribo and the sea are well cultivated.

SUROWIECKI, Wawrzyniec, a Polish author, born near Gnesen in 1796, died in Warsaw, June 9, 1827. He studied at Warsaw, spent some years in foreign countries, especially at Dresden and Vienna, and after his return to Warsaw held various civil offices in the national service. His principal works are: *O upadku przemysłu i miast w Polsce* ("On the Decline of Industry and Towns in Poland," Warsaw, 1810), and *Śledzenie początku narodów sławiańskich* ("Researches on the Origin of the Slavic Nations," Warsaw, 1820).

SURPLICE (Lat. *superpelliceum*), a white linen garment worn by the clergy in the performance of divine service. It differs from the alb in having wider sleeves, and was introduced in the 12th century for the purpose of making a distinction between the dresses of the superior and inferior orders of the clergy.

SURREY, a S. E. county of England, bounded N. by Middlesex, from which it is separated by the Thames, E. by Kent, S. by Sussex, W. by Hampshire, and N. W. by Berkshire; area, 789 sq. m.; pop. in 1861, 830,685. Beside Southwark and other suburbs of London, the most important towns are Croydon, Guildford, Kingston, Epsom, Reigate, Farnham, and Godalming. That part of Surrey which lies on the Thames and much of the land on the borders of the county is exceedingly rich and fertile. Parts of the shire are famed for the beauty of their scenery. The principal streams are the Wey, Mole, and Wandle, which fall into the Thames. There are extensive market gardens and flower farms, where beside flowers medicinal herbs are raised in large quantities. Numerous canals and railroads intersect the county. Silk, paper, earthenware, leather, ale, &c., are manufactured. Surrey returns 11 members to parliament.

SURREY, Earl of. See Howard, Henry.

SURRY. I. A S. E. co. of Va., bounded N. E. by James river, and S. W. by Blackwater river; area, 340 sq. m.; pop. in 1860, 6,133, of whom 2,515 were slaves. The surface is moderately hilly and the soil fertile. In 1850 the productions were 204,975 bushels of Indian corn, 35,133 of wheat, 65,093 of potatoes, and 14,809 of peas and beans. There were 11 churches. The value of real estate in 1856 was $860,121, showing an increase of 18 per cent. since 1850. Capital, Surry Court House. II. A N. W. co. of N. C., bordering on Va., bounded S. by the Yadkin, and drained by Ararat and Fisher rivers; area, about 900 sq. m.; pop. in 1860, 10,379, of whom 1,246 were slaves. The surface is in part mountainous and generally hilly. Ararat or Pilot mountain, in the S. E., is the highest peak in this region. The productions in 1850 were 552,454 bushels of Indian corn and 145,472 of oats. There were 3 cotton factories, 7 iron forges, 1 foundery, 11 distilleries, 30 churches, and 2,098 pupils attending public schools. Capital Rockford.

SURVEYING (Fr. *surveoir*, to overlook), the measuring of portions of the surface of the earth, either for the purpose of calculating the contents of areas, of laying out tracts of required extent, of establishing roads, or of preparing maps upon which such objects belonging to the surface are represented as the special purposes in view require. The ancient science of geometry grew out of the practice of surveying, and now embodies the mathematical principles upon which the work is conducted. That this science was cultivated by the Egyptians at a very early period is well established, and many of the old Greek writers, as Herodotus, Plato, Diodorus, Strabo, and others, ascribe its origin to changes which annually took place from the inundation of the Nile, and to the consequent necessity of adjusting the claims of each person respecting the limits of the lands. Diodorus says the children of the priests especially, "pay great attention to geometry and arithmetic; for the river changing the appearance of the country very materially, causes many and various discussions among neighboring proprietors about the extent of their property; and it would be difficult for any person to decide upon their claims without geometrical proof, founded on actual observation." The progress of the art of surveying to its higher application in determining the figure of the earth has been traced in the article Earth; and the details of operations in trigonometrical surveys upon a grand scale, are described under Coast Survey.—The systems of surveying may be classed according to its special objects; as land surveying, for determining the contents of areas, or dividing tracts into lots of smaller dimensions; topographical surveying, which includes, beside the measurement of horizontal lines and angles, that of the variations of level also, so that the superficial inequalities may be graphically represented; hydrographical or maritime surveying, the object of which is the determination of the positions of channels, shoals, rocks, and the shore line; and mining surveying, for fixing the positions of the underground works in mines, so that these can be correctly mapped. Surveys extending over large territories involve the consideration of the curvature of the earth and the use of spherical trigonometry, and are called geodetic in contradistinction from ordinary surveying over more limited areas, which may with sufficient accuracy be conducted without reference to the figure of the earth, and which may be termed plane surveying. (See GEODESY.) These systems all involve the same principles of measuring lines and angles between definite points upon the area included in the survey, and reproducing these upon paper, the lines being reduced to some convenient scale. Calculating the content of the area is commonly the conclusion of the work of land surveying. Various methods may be adopted in conducting these operations. Tracts of any shape or size may be accurately surveyed, if tolerably level and clear, with no other instrument than the surveyor's chain, of which a description has been given under GUNTER, EDMUND; and for this may be substituted a measuring tape, a measured rope, or leather driving reins. This is done by measuring all the sides of the tract, and then diagonals from one corner to another, so selected as to divide the tract into triangles as nearly equilateral as possible. The number of diagonals will be two less than the number of sides. In using the chain it is to be kept as nearly horizontal as possible, or if the measurement is made on a slope the variation from the horizontal is to be determined and duly allowed. In case the corners are not visible from each other, intermediate points may be adopted and used for the terminations of lines from corners, the object being in every case to divide the tract into triangles of which the sides are all measured. Proof lines measured from a corner of each triangle to the opposite side serve to rectify the other measures of the triangle, and if perpendicular to the side afford a convenient means of calculating upon the ground the area of the triangle. Perpendiculars to any line are readily laid out with a chain, as carpenters and masons draw right angles by what they call the 6, 8, and 10 rule, the popular application of the principle of the square of the hypothenuse being equal to the sum of the squares of the two other sides. The method is to measure from the point where the perpendicular meets the line, either along this line or along the perpendicular, a distance equal to 6 units of any kind, and then upon the other of these lines a distance of 8 units. The two lines are perpendicular to each other, when the two termini are just 10 units apart. Convenient distances for this measurement might be 3, 4, and 5 rods or chains. Other trigonometrical methods readily suggest themselves. A number of convenient instruments of simple form, known as the surveyor's cross, are in use, for setting out perpendiculars by lines of sight, crossing each other at right angles; and a temporary substitute for them is easily made by sticking a pin in each corner of a square piece of board, and sighting across these in the direction of the line and at right angles to it. Angles in the field are determined by a chain, by measuring a "tie line" from a measured point on one side to another measured point on the other side. By this means, the boundaries of a tract may be determined when it cannot be conveniently measured off in triangles. A great variety of expedients are adopted for overcoming natural obstacles and determining the extent and shape of inaccessible objects, systems of triangles being in such cases formed outside of and around such objects. Crooked lines are determined by means of perpendicular offsets measured from different points along a straight line run as nearly coincident to the crooked line as may be. In all the methods of surveying, the measurements, together with various incidental observations, are recorded, after some established system, in what are called field notes, and from these the results of the survey are afterward plotted to some convenient scale.—A more common system of surveying is that in which instruments for taking angles are employed in connection with the chain. A graduated horizontal circle with a straight edge, called an alidade, turning upon its central point, which may be conveniently sighted along, furnishes the means of ascertaining the angular distance of two lines when set at their intersection, and the alidade is pointed in the direction of one and then of the other. This involves the principle of the engineer's transit, in which the alidade is a telescope, provided, in the common focus of the object glass and of the eye piece, with cross hairs or delicate filaments, one horizontal and the other vertical. The telescope is supported in a frame, upon a horizontal axis, so that it may be turned completely over, for taking back sights as well as forward sights, and thus rectifying the observation, while the frame turns with the telescope upon a horizontal circular plate, graduated around its margin and furnished with a vernier on each side. If the telescope be fixed to a graduated vertical circle also, and a level is added, the instrument is called a theodolite. With these instruments angles can be determined with great accuracy, especially when the observations are repeated by reversing the instrument and taking the mean, each including the reading of both verniers. With the transit and the chain for measuring distances, tracts of almost any dimensions are accurately surveyed by measuring the angles at its corners, and the correctness of the work is proved when the sum of all the interior angles is found equal to the product of 2 right angles, or 180°, by the number of sides of the tract less 2; or if the instrument be used by the method called traversing, or "surveying by the back angle" (which consists in noting the angle which each successive line makes, not with the preceding line, but with the first line observed, which is hence called the meridian of the survey), then the reading, on getting round to the last station and looking back to the first line, should be 360°, or 0°. A compass and chain may be employed in filling up the interior details of a large survey with the transit; and the compass may be used for determining the magnetic bearing of one of the lines, unless this be astronomically ascertained by observations of the north star or of the shadows before and after noon.—The compass is the instrument in most common use in ordinary surveying. The magnetic needle, wherever the instrument is set, establishes the meridian line, and from this, the sights of the instrument being turned to any other line, the angle of divergence is read on the graduated circle around the compass box. This instrument has been described under its own name, and the method of using it and its defects alluded to; also the more perfect instrument, in which its inaccuracies are obviated, under the head of COMPASS, SOLAR.—The details of surveys are variously modified according to the extent of the area, character of the ground, &c. With the transit or compass, the boundary lines may be all followed out, the angles they make with each other determined, and their lengths measured by the chain; the points of crossing of roads, brooks, fences, &c., measured, and the bearings of these objects taken; and increased accuracy may be given to the work by running diagonal or proof lines, as in chain surveying. Additional checks are furnished by taking at each station the bearings of some marked objects, which, when the work is plotted, should severally fall at the points of intersection of the lines directed toward these objects from the several stations. Sometimes a tract may be surveyed from a measured base line, either a line within or without it, or one of the boundary lines, by placing the compass successively at each end of this line and taking the bearings of each corner; or without a compass the work may be very conveniently performed with approximate correctness by the plane table method, provided no angles are taken less than 30° nor larger than 150°. A drawing board covered with paper is set up at one end of a measured base line, and a ruler furnished with upright sights at each end, exactly over the drawing edge, is set with this edge against a fine needle stuck up in the board, and is then directed successively toward the corners of the tract to be surveyed and any other prominent objects, toward which from the needle lines are to be drawn on the paper. One of these lines should also be in the direction of the measured line. The instrument is then taken to the other end of the measured line, the needle is removed along the last line named on the board a distance corresponding, according to the scale adopted, to that of the measured line on the ground, and the board is so placed as to make the line toward the former station correct. The ruler is then again pointed to the same objects, and lines are drawn toward each from the new position of the needle. Their intersections with the former lines designate the places of these objects on the plane. The plane table is used in various other ways, as by moving it from one corner to the next, and placing it at each so that the last line drawn coincides with that in the ground. From any central point also radiating lines may be measured to the corners, and the distances measured and marked off according to the proper scale.—Rivers, brooks, and roads are surveyed by measuring a succession of lines following their general course, and taking offsets from the sides of the line. Streets of cities are followed in a similar manner. Distances are sometimes measured upon roads, where expedition is more important than extreme accuracy, by various substitutes for the chain, some of which, as the odometer and pedometer, have been noticed under the former head. One may soon accustom himself to pace in straight lines, and with steps of uniform lengths, the most exact method being to regulate the natural step, rather than to try to attain one of any determinate length, as a yard. The usual average step of a man is that of the English military pace, $2\frac{1}{2}$ feet. The French geographical engineers accustom themselves to take regular steps of $\frac{8}{10}$ of a metre, or 2 feet $7\frac{1}{2}$ inches.—The field work being completed, the figure of the tract surveyed is reproduced upon a diminished scale by what is termed plotting; and from this plot the contents are ascertained by a series of mathematical calculations applied successively to the several divisions; or by the method of calculation of latitudes and departures, for which a table of natural sines is required, unless "traverse tables" giving the latitude and departure for any bearing, as furnished in some books on surveying, are at hand. An approximate estimate of the number of acres included in the survey is sometimes made by drawing the plan upon sheet lead of uniform thickness or upon Bristol board or heavy paper, cutting out the piece on the boundary lines, and weighing it in a delicate balance. The weight may then be compared with that of a similar piece that exactly comprises a definite number of acres, laid out upon the same scale.—The extensive territories of the United States are surveyed upon a peculiar system, planned with reference to the division of the lands into squares of uniform size, so arranged that any tract of 160 acres, or a "quarter section," may have its distinct designation and be readily found upon the map or recognized upon the ground by the marks left by the surveyors. Each great survey is based upon a meridian line run due N. and S. by astronomical measurements the whole extent of the survey in these directions; and upon a "standard parallel" or base line, running E. and W., similarly established with great accuracy. Parallels to these lines are run every 6 miles, usually with the solar compass corrected by frequent celestial observations; and thus, as nearly as the figure of the earth admits, the surface is divided into squares of 6 miles N. and S. and the same E. and W., each one containing 36 square miles or sections, into which the territory is further divided by meridians and parallels run at every mile; while the half mile being marked on these lines by setting what is called a quarter post, the points are established for the subdivision into quarter sections. The squares of 36 square miles are termed townships, often contracted to "towns;" and each line of them E. and W. is numbered either N. or S. from the base line, and each line of them N. and S. is termed a range and is numbered E. or W. from the meridian. The N. and S. lines bordering the townships are known as range lines, and the E. and W. as township lines. Each survey is designated by the meridian on which it is based; and of these principal meridians there are 5, from the first one commencing at the mouth of the Great Miami river to the 5th from the mouth of the Arkansas river N. The 2d one runs through the centre of the state of Indiana, the 3d from the mouth of the Ohio through Illinois, and the 4th from the mouth of the Illinois river N. The state of Michigan has a distinct meridian, and its base line crosses the lower peninsula of the state from Lake St. Clair to Lake Michigan. The 36 sections of each township are numbered in order, beginning with the N. E. corner and thence proceeding along the N. side of the township to section 6 in the N. W. corner; section 7 commences the next line of sections S., the numbers running E. to 12, and then beginning the 3d line with 13 and running W. to 18, and so on, bringing No. 36 in the S. E. corner of the township. The quarter sections are designated by their position as N. E., N. W., S. E., and S. W. Fractional sections of irregular shapes are admitted on the borders of lakes, rivers, &c. With these explanations any tract may be readily pointed out upon the government maps from its abbreviated description, or any locality in the wildest territory may be correctly defined; thus the S. W. qr. sect. 13, T. 66 N., R. 34 W., meridian Michigan, is traced directly to an old mining location near the N. E. extremity of Isle Royale, Lake Superior. The law which established this system, while it required that the N. and S. lines should be true meridians, also required, what was entirely inconsistent with this, that the townships should be 6 miles square; for the figure of the earth causes the meridians to converge toward the pole, thus making the N. line of each township shorter than its S. line, an inequality which becomes more and more marked the higher the latitude of the surveys. Provision is consequently made for correcting the errors thus caused, by establishing what are called correction lines, which are parallels bounding a line of townships on the N. when lying N. of the principal base, or the S. line of townships when lying S. of the principal base, from which the surveys as they are continued are laid out anew, the range lines again starting at correct distances from the principal meridian. In Michigan these correction lines are repeated at the end of every 10th township; but in Oregon they have been repeated with every 5th township. The instructions to the surveyors have been that each range of townships should be made as much over 6 miles in width on each base and correction line as it will fall short of the same width where it closes on to the next correction line N.; and it is further provided that in all cases where the exterior lines of the townships shall exceed or shall not extend 6 miles, the excess or deficiency shall be specially noted and added to or deducted from the western or northern sections or half sections in such township, according as the error may be in running the lines from E. to W. or from S. to N. In order to throw the excesses or deficiencies on the N. and on the W. sides of the township, it is necessary to survey the section lines from S. to N. on a true meridian, leaving the result in the N. line of the township to be governed by the convexity of the earth and the convergency of the meridians. Navigable rivers, lakes, and islands are "meandered" or surveyed by the compass and chain along the banks. The instruments employed on these surveys, beside the solar compass, are a surveying chain 33 feet long of 50 links, and another of smaller wire as a standard to be used for correcting the former, as often at least as every other day; also 11 tally pins made of steel, telescope, targets, tape measure, and tools for marking the lines upon trees or stones. In surveying through woods, trees intercepted by the line are marked with two chops or notches, on each side; these are called sight or line trees. Other trees near by not touched by the line are blazed on two sides, quartering toward the line; but if at some distance from the line, the two blazes should be near together, on the side facing the line. These are generally found to be permanent marks, not only recognizable for many years, but they carry with them their own age by the rings of growth around the blaze, which may at any subsequent time be cut out and counted as years; and the same are recognized in courts of law as evidence of the date of the survey. They cannot be obliterated by cutting down the trees or otherwise without leaving evidence of the act. Corners are marked upon trees, if found at the right spots, or else upon posts set in the ground, and sometimes a monument of stones is used for a township corner and a single stone for section corners; mounds of earth are made where there are no stones nor timber. At the corners the 4 adjacent sections are designated by distinct marks cut into a tree, one in each section. These trees facing the corner are plainly marked with the letters B. T. (bearing tree) cut into the wood. Notches cut upon the corner posts or trees indicate the number of miles to the outlines of the township, or, if on the boundaries of the township, to the township corners. These marks afford to those who are travelling through wild territories exact knowledge of their position.—A useful text book is the "Treatise on Land Surveying" of W. M. Gillespie (8th ed., New York, 1861).

SURVILLE. See Clotilde de Surville.

SUSA (Gr. *τα Σουσα*, the city of lilies), an ancient city of Persia, the Shushan (Heb., lily) of the Scriptures, the capital of the province of Susiana, and one of the residences of the court. It was on the E. bank of the Choaspes, enjoyed a fine climate, and was one of the largest cities of the Persian empire. Strabo says it was 120 stadia in circumference, and surrounded like Babylon with a wall of burnt brick. According to Æschylus and Pliny, it was founded by Darius Hystaspis, though others make Tithonus, the father of Memnon, its founder. It was for a long period the chief treasury of the Persian empire. In 325 B. C., when Alexander visited it, it possessed immense wealth, and from its plunder he gave largesses to his soldiers and presents of great value to his generals on the occasion of his marriage with Barsine and Parysatis. There has been considerable controversy on the site of the ancient city, Sus, situated at the juncture of the Kerah (Choaspes) and the Diz, and Shuster both having their advocates. The question has been definitely settled by the researches of Sir W. F. Williams and Mr. W. K. Loftus, who discovered a gigantic tumulus and numerous cuneiform and some Greek inscriptions at Sus, giving the name of one of the governors of Susiana, and describing the completion of a palace then commenced by Darius Hystaspis.—See Loftus, "Travels and Researches in Chaldea and Susiana."

SUSIANA, an ancient province or region of Persia of great extent, but mostly a plain, bounded N. by Media and the chain of the Parachoathras, E. by the same mountains and the river Oroatis, S. by the Persian gulf, and W. by the plains of Mesopotamia and Babylonia. It thus nearly corresponded to the modern province of Khoozistan. It was drained by the Eulæus (now the Karoon), the Choaspes (Kerah), the Coprates (Abzal), the Hedyphon (Jerrahi), and the Oroatis (Tab). Its earliest inhabitants were the Elymæi, probably the Elamites of Scripture, and a portion of these still occupied it in the time of Strabo and Æschylus; the other tribes mentioned as settled in the province are the Susii, the Cissii, the Cossæi, the Uxii, and the Messabatæ. The first named were agriculturists and had their villages on the plain; the others were robbers, who made their homes in the mountains, and descended to the plain only to plunder the more peaceful inhabitants.

SUSO, Heinrich, often called Amandus, a German mystic, born in Constance probably in 1300, died in Ulm, Jan. 25, 1365. He entered the order of Dominicans in his 18th year, and received the degree of doctor at Cologne. From his 18th to his 40th year, in his cloister on the lake of Constance, he submitted to the severest mortification. His penance threatened to be fatal, when he threw his instruments of torture into the lake, and set out as a preacher through Swabia, Switzerland, and the valley of the Rhine. His sympathetic character and mystical teachings gave him influence especially over women, and occasioned scandal. He has been called a minnesinger of heavenly things, and his works are, according to Görres, among the most delightful of mystical writings. Among them are an autobiography, a treatise on eternal wisdom, and a treatise on truth. Editions with woodcuts were published at Augsburg in 1482 and 1512. There is a translation into modern German by Diepenbrock (Ratisbon, 1829; 2d. ed., 1838).

SUSQUEHANNA, a river of New York, Pennsylvania, and Maryland, having its source in Otsego and Canaderaga lakes, in Otsego co., N. Y. It flows in a generally S. W. direction to the Pennsylvania line in Broome co., receiving the Unadilla and several smaller tributaries in its course; near the Pennsylvania boundary it flows around the base of a spur of the Alleghanies, first a little N. of W. and then suddenly N. N. W., to Binghamton, forming what is called the "Great Bend;" after receiving the Chenango at Binghamton, its course is W. by S. till it again reaches the Pennsylvania line, where it takes a S. E. direction to Pittston, Luzerne co., receiving the Tioga and numerous small tributaries in its course; at Pittston it turns sharply to the S. W., and receives near Sunbury the large affluent known as the West branch of the Susquehanna, which is more than 200 m. in length, and to its junction with which the stream is sometimes called the North or East branch; then, turning southward, it receives the Juniata at Duncannon, 14 m. from Harrisburg, and flowing thence in a S. E. course, enters the Chesapeake bay at Havre de Grace. Its length is a little more than 400 m. from Otsego lake to the bay, and from the junction of the two branches 153 m. The river is generally shallow, and its course much broken by rapids; in the spring, during flood, rafts, and strong boats float down from Binghamton, but at other times it is not navigable. Immense quantities of timber are transported upon it. Canals have been constructed along its banks, on the main stream for 125 m., and on the West branch for 124 m. Its waters abound with fine fish; shad in great quantities are caught every season and exported largely. The lower waters of the Susquehanna are famous for the great abundance of ducks and other wild fowl which collect there every winter; and millions are exported to the Baltimore, Philadelphia, and New York markets.

SUSQUEHANNA, a N. E. co. of Penn., bordering on N. Y., and drained by tributaries of the Susquehanna river; area, 800 sq. m.; pop. in 1860, 36,267. The surface is very hilly, and the soil fertile and well adapted to grazing purposes. The productions in 1850 were 33,783 bushels of wheat, 287,343 of Indian corn, 50,105 tons of hay, and 1,020,578 lbs. of butter. There were 30 grist mills, 122 saw mills, 4 woollen factories, 4 iron founderies, 25 tanneries, and 2 newspaper offices; and in 1860 there were 10,674 pupils attending public schools. Timber is abundant, and the export trade in pine lumber is very extensive. The Erie railroad traverses a few miles of the N. E. part, and the county is intersected by the Delaware and Lackawanna railroad. Capital, Montrose.

SUSSEX. I. A N. co. of N. J., bordering on N. Y. and Penn., bounded N. W. by the Delaware river, and drained by the Flatkill, Paulinskill, Wallkill, and Pequest; area, 600 sq. m.; pop. in 1860, 23,855. The Blue mountains traverse the N. and the Hamburg and Wawayanda mountains the S. part, and the remainder of the surface is very hilly; the soil is very fertile. The productions in 1850 were 459,254 bushels of Indian corn, 66,006 of wheat, 229,795 of rye, 151,011 of oats, 1,816,610 lbs. of butter, and 37,711 tons of hay. There were 13 forges, 6 founderies, 3 furnaces, 25 grist mills, 11 saw mills, 44 churches, 4 newspaper offices, and 7,196 pupils attending public schools. The Hopatcong lake is in the S. E. part, and supplies the summit level of the Morris canal; and there are several other small lakes or ponds. Franklinite, iron ore, red oxide of zinc, and other minerals are found. It is traversed in the S. part by the Morris canal and the Sussex branch of the Morris and Essex railroad. Capital, Newton. II. A S. co. of Del., bordering on Md., Delaware bay, and the Atlantic, and drained by affluents of the Nanticoke and Pocomoke rivers and other streams; area, about 1,000 sq. m.; pop. in 1860, 29,617, of whom 1,341 were slaves. The surface is almost level, and the soil fertile. The productions in 1850 were 1,180,086 bushels of Indian corn, 43,725 of wheat, 50,796 of potatoes, and 108,489 lbs. of butter. There were 29 grist mills, 60 saw and planing mills, 8 tanneries, 1 forge, 2 newspaper offices, 59 churches, and 4,874 pupils attending public schools. It is intersected by the Delaware railroad. Capital, Georgetown. III. A S. E. co. of Va., bounded N. E. by Blackwater river, and intersected by the Nottoway; area, 400 sq. m.; pop. in 1860, 10,175, of whom 6,384 were slaves. The surface is hilly, and the soil fertile. The productions in 1850 were 356,171 bushels of Indian corn, 35,133 of wheat, and 780 bales of cotton. There were 24 churches, and 249 pupils attending public schools. It is intersected by the Petersburg railroad. The value of real estate in 1856 was $1,045,799, showing an increase of 14 per cent. since 1850. Capital, Sussex Court House.

SUSSEX, a S. E. county of England, bounded N. by Surrey, N. E. by Kent, S. by the English channel, and W. by Hampshire; area, 1,468 sq. m.; pop. in 1861, 363,648. It has two capitals, Chichester and Lewes; and the other towns of greatest importance are Brighton, Hastings, New Shoreham, Rye, and Horsham. The coast line is not much broken, the most remarkable projection being Beachy Head, which is 564 feet above the sea. A range of chalk hills, called the North Downs, crosses the N. E. part of the county; and the South Downs, with an average height of 500 feet, and from 4 to 6 miles broad, run through its entire length nearly parallel to the sea coast. The principal rivers are the Arun, Adur, Ouse, and Cruckmere. The county is purely agricultural, and wheat and hops are the chief crops. The downs are principally used for pasturage, and are famous for the quality of the mutton fed upon them. Sussex is remarkably rich in antiquities, and contains many noble mansions. It returns 18 members to parliament, 2 each for East and West Sussex, and 14 for boroughs.

SUTHERLAND, a N. county of Scotland, bounded N. by the Atlantic ocean, E. by Caithness and the North sea, S. by Ross and the frith of Dornoch, and W. by the Minch; area, 1,754 sq. m.; pop. in 1861, 25,208. Dornoch, the capital, is the only town. Several small islands which lie off the N. and W. coasts are included in the county. On these sides the coasts are generally high and bold, and are indented by numerous arms of the sea; but that on the E. is flat with a low sandy beach. The interior is mountainous, the highest summit reaching the height of 3,230 feet above the sea. The rivers are all small with short courses, but there are numerous lakes. The principal crops raised are oats, barley, and potatoes. Sheep farming is extensively carried on. Game, more particularly deer, is abundant.

SUTLEJ, or SUTLEDGE, a river of Hindostan, the most easterly of the five rivers of the Punjaub. It has its rise in some lakes in Thibet N. of the Himalaya mountains, about lat. 31° 8′ N., long. 81° 53′ E., and in the early part of its course is joined by numerous tributaries. In about lat. 30° 10′ N., long. 75° 10′ E., after a course of 550 m., it unites with the Beas, and the river from thence is called the Ghara until its junction with the Chenaub, 300 m., when it takes the name of Punjnud, and joins the Indus after a further course of 60 m., in lat. 28° 40′ N., long. 70° 35′ E. The upper Sutlej is supposed to be the Hesudrus and the lower the Hyphasis of the ancients. In the upper part of its course the Sutlej is an impetuous torrent, and the scenery magnificent.

SUTTEE (Sans. *sati*, from *sat*, pure), properly, a chaste and virtuous wife, but commonly used to designate the self-immolation of a widow by burning or burying alive, in connection with the dead body of her husband. The practice of suttee has existed for many centuries not only in India but in other Asiatic countries. Diodorus Siculus gives an instance which occurred in the army of Eumenes more than 300 years B. C., and in India there is reason to believe it was practised as early as the 14th century B. C. It was more prevalent there than elsewhere, from the belief encouraged by the Brahmins, and professedly derived from their most sacred books, that it conferred the highest merit not only on the widow herself, but on her dead husband. It was asserted by the Brahminical writers that every woman who thus burned herself should remain in paradise with her husband 3 crores and 50 lacs of years (35,000,000), while otherwise she would have no place in paradise. Recent examinations of the Vedas and the Institutes of Manu by eminent philologists show that these works contain no command for suttee, and that the passages formerly quoted by Brahmins in favor of it were in some instances exactly the reverse of what the Brahmins represented. The practice was very prevalent in India long after the East India company came into power there. The Mohammedan emperor Akbar had prohibited it in the 16th century, but probably without much effect. In 1813 the company undertook to regulate the practice by prohibiting the wife from being burned separate from the body of her husband, and also from sacrificing herself with the body unless she did it voluntarily. This did not materially diminish the number of cases, for in the 12 years between 1815 and 1826 there were 7,154 officially reported in Bengal alone. In 1829 Lord William Bentinck, then governor-general of India, enacted a law declaring all aid, assistance, or participation in any act of suttee to be murder, and punishable as such. This law, at first applicable only to Bengal, was soon extended over all the company's territories, and wherever possible incorporated in the treaties made with the native princes. This created much excitement at first in Bengal, the Brahmins denouncing it with great violence as an interference with their religion, and even sending an agent to England with a large sum of money to procure its repeal. The powerful influence of Rammohun Roy was exerted against the practice, and the excitement soon subsided. Suttee is still occasionally, though rarely, practised in some of the subsidiary governments of India.—The mode of performing it was much the same throughout India, varying only according to the rank of the parties or the customs of each province. Sometimes the widow was buried alive by the side of the corpse, but generally the self-immolation was by burning. The widow, seating herself by the side of her husband's body, had the sides of her feet painted red, and then bathed herself, and dressed in her finest clothes. Meantime a drum was beaten through the adjacent villages to indicate the sacrifice that was to take place. A large company having assembled, a hole was dug in the ground, and a bed formed of green boughs, on which was reared the funeral pile of dry fagots, hemp, clarified butter, and other combustibles. The widow then gave her ornaments to her friends, painted her forehead, tied red cotton round her wrists, put two new combs in her hair, and when the body of her husband was placed upon the pile, walked around it 7 times, scattering parched rice and cowries, and finally ascended the pile, to which she was secured with ropes. The eldest son, or the head man of the village, usually lighted the pile.

SUTTER, a central co. of California, bounded S. W. by the Sacramento and E. by Feather river; area, 625 sq. m.; pop. in 1860, 3,390. The surface is in some parts mountainous, and in the N. is the remarkable group of peaks called the Buttes; the soil is fertile. The productions in 1858 were 62,300 bushels of wheat, 308,000 of barley, 28,000 of oats, 3,000 tons of hay, 35,000 lbs. of butter, and 25,000 of wool. Capital, Yuba City.

SUTTON, Amos, D.D., an English missionary, born at Sevenoaks, Kent, in 1798, died in Cuttack, India, Aug. 17, 1854. He studied theology under the Rev. J. G. Pike, secretary of the general Baptist missionary society, was ordained as a missionary at Derby in 1824, and was sent to Orissa, India. He remained in the missionary work for 30 years, visiting England and America once in that period. He preached in English and in Oriya, though for some years he had not the charge of a mission church; he was tutor in the mission academy and superintendent of the society's asylums for orphans, and translated the whole Scriptures into Oriya, revising the New Testament a second time. He also compiled and published an Oriya dictionary, grammar, and lesson book, wrote 3 volumes of tracts in that language, and translated 13 English works, school books, and religious treatises into it, for the use of his scholars and converts. In English he published "The Family Chaplain" (2 vols.), "Narrative of the Mission to Orissa," "Orissa and its Evangelization," "Hymn Book for Mission Congregations," "Guide to the Saviour," and one or two smaller works.

SUWANEE, a N. co. of Florida, intersected by the Suwanee river; area, about 750 sq. m.; pop. in 1860, 1,388, of whom none were slaves. There are 2 or 3 small lakes and several swamps. Capital, Suwanee.

SUWAROFF, Alexander Vasilievitch, count, Prince Italiyski, a Russian field marshal and generalissimo, born in Moscow, Nov. 13, 1729, died in St. Petersburg, May 18, 1800. He was of a Swedish family who had emigrated to Russia in 1622. He entered the army at the age of 13 as a cadet, attained the rank of lieutenant-colonel in 1757, at the commencement of the war with Prussia was appointed commandant of Memel, and in 1759 distinguished himself at the battle of Kunersdorf. In 1763 the empress Catharine II. gave him a commission as colonel of the Astrakhan infantry, and his success in defeating the confederates of Bar in Poland, in 1768 and the following years, made him major-general. In 1773, serving under Field Marshal Rumiantzoff, he defeated the Turks in 3 battles, and, after a junction with General Kamenskoi, gained a most decisive victory over the Turkish commander at Kosludgi, and was appointed general of division. During the peace which followed, he was engaged in appeasing the troubles among the peasantry in the interior of Russia. He subsequently subdued to the Russian sway the khan of the Crimea and the Nogai Tartars, compelling the latter, in 1783, to render homage to the empress, for which service Catharine made him general-in-chief. He again led an army against the Turks in 1788, and raised the siege of Kinburn, took Otchakov the following summer, defeated Mohammed Pasha at Fokshany, and on Sept. 22 routed the main army of the Turks on the banks of the Rimnik, for which he received the title Rimnikski, and that of count of the empire. He next laid siege to Ismail, which long withstood his forces, and was at last carried by assault, though the Russians were twice repulsed with terrible loss. Suwaroff gave it over to plunder, and 30,000 Turks were massacred and 10,000 made prisoners. At the peace of Jassy he was made governor of Ekaterinoslav, the Taurida, and the conquered provinces at the mouth of the Dniester. In 1794 he was ordered to put down the insurrection in Poland; and after defeating Kosciuszko he carried Praga (one of the suburbs of Warsaw) by assault, deluging it with blood, and entered Warsaw Nov. 9, 1794. For this service the empress made him field marshal and lavished costly presents upon him. Paul I. on his accession was prejudiced against him and stripped him of his rank; but in 1799, at the request of the emperor of Germany, he confided to him the command of the allied army sent to Italy against the French. Here he gained some advantages at Cassano, defeated Macdonald upon the banks of the Trebia, and Joubert at Novi, but was driven out of Switzerland by Masséna. He was recalled to Russia, and the title of Prince Italiyski conferred upon him; but before he could reach the capital the insane monarch had become offended with him for a trifle, and, recalling all the preparations made for his triumphal entry into the capital, publicly disgraced him. The chagrin which this treatment caused the old soldier, already broken in health, led to his death. In 1801 the czar Alexander caused a statue to be erected to his memory in the Champ de Mars of St. Petersburg. His autobiography has been published under the title of *Vie de Souworoff tracée par lui-même, ou collection de ses lettres et de ses écrits*, edited by Serge Glenka (2 vols, 8vo., Moscow, 1819), and 10 or 12 memoirs have appeared in Russia and elsewhere.

SWABIA, or SUABIA (Ger. *Schwaben*), a duchy of the German empire during its earlier period, and subsequently one of its 10 great circles, or great divisions. The circle was bounded N. by the Palatinate of the Rhine and Franconia, E. by Bavaria, S. by Switzerland, and W. by France, the Rhine flowing on the borders of the two latter. It had an area of 12,000 sq. m., and a population of 2,200,000, and was conterminous with the modern divisions of Würtemberg, the southern part of Baden, and the province of Swabia and Neuburg in Bavaria. The country, one of the most beautiful and fertile tracts in Germany, is traversed by the Danube from S. W. to N. E., and diversified by the mountain scenery of the Black Forest on the W. and the Alps on the S. It was originally called Alemannia, and received the name of Swabia (from the Suevi, who inhabited parts of it) when the Alemanni were conquered by Clovis in 496. Columba, an Irish monk, introduced Christianity in the 7th century. Toward the end of the 11th century it was in a very flourishing condition, and in 1080 the emperor Henry IV. made the duchy of Swabia hereditary in the family of Frederic of Hohenstaufen. It subsequently became one of the most powerful and most civilized countries of Germany. In the Italian wars the reigning house of Swabia stood at the head of the Ghibelline party, and when Conradin was executed at Naples in 1268 the line became extinct. The various cities, prelates, and counts then made themselves independent, and since that time Swabia has not formed a separate state. Various confederacies, however, were formed at different periods, known in history under the name of Swabian unions. The principal of these was the "great Swabian union" of 1488. The Swabian circle was definitely organized in 1563.

SWAIN, CHARLES, an English poet, born in Manchester in 1803. His father dying early, his education was superintended by his maternal uncle, a French gentleman named Tavaré, who subsequently took him into his own business, that of a dyer. When about 30 years of age Mr. Swain exchanged this occupation for that of an engraver, in which he still continues. His first literary productions appeared in the periodicals, and in 1828 he published a volume of "Metrical Essays," followed by "Beauties of the Mind" (1831) and "Dryburgh Abbey" (1832), an elegy on Sir Walter Scott, which elicited the favorable comments of Southey. His subsequent publications comprise "A Memoir of Henry Liversedge" (1835); "Rhymes for Childhood" (1846); "Dramatic Chapters, Poems, and Songs" (1847); "English Melodies" (1849); "Letters from Laura d'Auverne," &c. They have had considerable popularity in England, where the author is known as the "Manchester poet," and a collection of his poems has recently appeared in the United States (32mo., Boston, 1858).

SWAIN, DAVID LOWRY, an American statesman and educator, born near Asheville, Buncombe co., N. C., Jan. 4, 1801. He was admitted to the bar of North Carolina in 1823, and soon entered upon a lucrative practice. In 1824 he was elected to represent Buncombe co. in the house of commons, and in 1831 was appointed one of the judges of the superior court. In the succeeding year he was chosen governor of the state, being the youngest man that ever filled that office in North Carolina. Upon the expiration of his term of office in 1835, he succeeded Dr. Caldwell as president of the university of North Carolina, a position which he still occupies (March, 1862).

SWAINSON, WILLIAM, an English naturalist, born in Liverpool, Oct. 8, 1789. He served in the Mediterranean in the army commissariat department from 1807 to 1815, then travelled in South America with Koster, the German naturalist, and on his return settled in London, and devoted himself to the study of natural history. In 1820 he commenced the publication of "Zoological Illustrations, or original Figures and Descriptions of new, rare, or interesting Animals," since republished in 6 vols. 8vo.; and in 1821 of a work on the mollusca, under the title of "Exotic Conchology" (4to.). He is also the author of a "Naturalist's Guide for collecting and preserving all Subjects of Natural History and Botany," &c. (1822); of numerous papers on natural history in the "Journal of the Royal Institution," "Zoological Journal," and "Magazine of Natural History;" of 12 volumes on different departments of natural history in Lardner's "Cabinet Cyclopædia," regarded as of high authority; of two volumes on the "Birds of Western Africa" and one on the "Fly Catchers," in Jardine's "Naturalist's Library" (1837-'8); of "A Treatise on Malacology, or the Natural Classification of Shells and Shell Fish" (1840); and of a series of "Ornithological Drawings," being selections of Brazilian and Mexican birds (1834-'41). He also assisted Sir John Richardson in the preparation of that part of his "Fauna Boreali-Americana" which relates to North American birds, and in connection with Mr. Shuckard prepared in 1840 a volume on the "History and Natural Arrangement of Insects." In 1841 he emigrated with his family to New Zealand, and since his residence there has published "Observations on the Climate of New Zealand."

SWALLOW, the general name of the diurnal fissirostral birds of the family *hirundinidæ*, including the swifts, many of which are called swallows. (See SWIFT.) The bill is short and weak, very broad at the base and suddenly compressed to the tip; the wings long, narrow, and acute; primaries 9 or 10, the 1st the longest; tail more or less forked; tarsi very short and weak, generally naked, and covered with scales; toes usually long and slender, with the claws moderate, curved, and sharp; the gape very wide and usually provided with short bristles. The typical genus *hirundo* (Linn.), having more than 50 species, embraces several well known, elegant swallows both in America and the old world, remarkable for their great powers of flight; their food consists of insects, which they take on the wing, usually in the neighborhood of water, with remarkable skill and grace; they drink on the wing, sweeping along the surface of the water, and often wash themselves by a sudden plunge. They fly at the rate of a mile a minute in their ordinary evolutions, but are rather awkward on the ground from the length of the wings and the shortness of the legs; they live more on the wing than any other birds, even feeding their young in the air; from the swiftness of their flight they are rarely caught by birds of prey, and are seldom hit by sportsmen; their sight is very acute; they fly low in damp weather, where the insects are most abundant, and are thence supposed to foretell rain. They are most numerous in the tropics, migrating to and from temperate regions in warm and cold weather; in Great Britain they make their appearance from Africa, where they spend the winter, from the beginning to the middle of April, and depart toward the end of October, crossing the channel singly or in small parties, and are as much exhausted by the passage as other migratory birds of inferior powers of flight; they often alight on vessels, and sometimes fall into the sea. In the United States they arrive about a month later and depart several weeks earlier. Most species prefer the neighborhood of man, building their nests in society in his dwellings and buildings; they form attachments to places, returning year after year to the same nests; though declared by ancient writers to be one of the two untamable animals (the fly being the other), they are docile and have been partially domesticated; they are useful to man in destroying insects, a single bird probably collecting about 1,000 in the course of a day. The nests are generally made of clay or mud mixed with straw and grass, of various forms, and attached externally to some building; many species breed in holes in sand banks, at the end of which is the nest of grasses and feathers; the eggs are 5 or 6. Swallows are alluded to in the sacred and ancient writings, and are the subjects of many strange tales and fabulous stories; they are generally considered the friends of man, and it is thought barbarous and unlucky to kill them; they are regarded as the winged heralds of summer.—The best known species in the old world is the chimney or house swallow (*H. rustica*, Linn.); it is 6½ inches long, bluish black above, with a band on the chest, and the forehead, eyebrows, and throat, ruddy; lower parts rufous white, with a white spot on the inner web of each tail feather except the 2 innermost; the tail is very long and forked. As its name imports, it frequently builds its nest in chimneys a few feet from the top; it also nests in old walls and shafts of mines, and among the rafters of barns and sheds; the nest is cup-shaped, made of earth and straw and lined with feathers; the eggs are white, spotted with ash and red. The parents are very attentive to the young, and brave in their defence; they have 2 broods in a season, the 2d sometimes left to perish, not being able to quit the nest at the period of migration, and the instinct which prompts to the latter being stronger than parental love; the males are sweet singers, and very courageous. The analogue of this species in America is not the one commonly called chimney swallow with us (which is a swift), but the barn swallow (*H. rufa*, Vieill.); it is about 7 inches long and 13 in alar extent; glossy steel blue above, with concealed white in middle of back; it much resembles its European congener, though it has the pectoral collar interrupted in the middle, while in *H. rustica* it continues across. It inhabits North America from the Atlantic to the Pacific, appearing in the southern states from the middle of February to March 1, a few at a time, reaching New England in mild seasons by the middle of May; it is welcomed as the harbinger of summer, seldom appearing before the final melting of the snow and the commencement of fine weather; as it commits no depredations on man's property, and serves him in destroying noxious insects and the teasing pests of horses and cattle, it is generally liked and protected; it is believed by some credulous people that if swallows are shot the cows give bloody milk, and that their presence in a barn prevents its being struck by lightning, concerning which Wilson says: "When the tenets of superstition lean to the side of humanity, one can readily respect them." It is gentle and easily tamed, and its twitterings are very pleasant to hear in a summer's day. The nest is made of mud or moist earth mixed with grasses, and is attached to the beams and rafters of barns and outbuildings; it is generally about 8 inches long, 6 in the greatest diameter, and from beam to outside of shell 6½ to 4, weighing often more than 2 lbs.; the eggs are 4 to 6, small and long, white with a few spots of reddish brown; incubation lasts 13 days, both sexes assisting, and both occupying the nest at night until the young are hatched. This species collects in large flocks in midsummer on barns and sheds, telegraph wires, &c., chirping almost continually, and making short sallies in search of insects. They start for the south by the end of August or first of September, early on some fair morning; they do not fly high, and follow the shore or the course of rivers.—The cliff or fulvous swallow (*H. lunifrons*, Say) is about 5 inches long and 12½ in alar extent; the crown and back are steel-blue, separated more or less broadly by a grayish collar; the chin, throat, and sides of head dark chestnut; breast grayish brown; belly white; steel-blue spot on throat; rump light chestnut, and forehead brownish white; tail slightly notched. It is found throughout North America from ocean to ocean; it is called republican swallow by Audubon, in allusion to the habit of associating to make their nests and rear the young. The nest is built under eaves and cornices, where it is partly sheltered from the rain; it is made of clay and sand, the entrance near the top, shaped like an earthen retort with the neck broken off; it is lined with straw and grass; the eggs are white with dusky spots; the nest is bravely defended by the parents. The white-bellied swallow or American house martin (*H. bicolor*, Vieill.) is 6½ inches long and 12½ in alar extent, of a glossy metallic green above and white below; it is a quarrelsome species, coming earlier in the spring than the others, but is not so common; the nest is made in a hollow tree, lined with grass and feathers, and the eggs are white with a bluish tinge; it is as widely distributed as the others in North America, and some time before migrating southward gets very fat on myrtle berries (*myrica cerifera*). For the largest of the American swallows, see MARTIN. The largest of the genus *hirundo* is the *H. Senegalensis* (Linn.), from Africa, shining black above, and ruddy on the belly and hind part of back. There are many species in the East Indies, some permanent residents, others migrating to temperate Asia. Some species usually called swallows, as those which make the famous edible nests so esteemed in the East, belong among the swifts.—The bank, sand, or river swallow belongs to the genus *cotyle* (Boie); it is the *C. riparia* (Boie), and the smallest of the American species, being 4¾ inches long and 10½ in alar extent. The bill is very flat, and extremely wide at base, gradually narrowing toward the tip; nostrils prominent and rounded; tail moderate, nearly even or very slightly forked; tarsi rather long, with a tuft of feathers near the toes behind. It is grayish brown above, sometimes approaching sooty, with paler margins; below pure white, with a band across the breast and sides like the back. It is generally distributed over America and Europe, wherever there is a sandy pit or river bank; it is hardy, the earliest to arrive in the spring, and less familiar than the other species; it hollows out a tubular gallery in the sand banks, often more than 3 feet in length, at the end of which is a larger excavation for the nest; it is called sand or bank martin in Europe. There is no appreciable difference between the European and American birds, furnishing one of the very few instances (perhaps the only one) among land birds of the same species permanently inhabiting both continents. In the rough-winged swallow (*C. serripennis*, Bonap.; *stelgidopteryx* of Baird), the 1st primary has the outer edge converted into stiffened recurved hooks, and the tarsus is without feathers.—In the genus *chelidon* (Boie) the tail is moderate and forked, and the tarsi and long toes are clothed with downy feathers; it is peculiar to the old world. The European window swallow, house martin, or martlet (*C. urbica*, Boie) is 5 inches long, black above, and white below and on rump; it has the same habits as the common swallow, with a less rapid but more sweeping flight; it is more familiar, breeding even in cities; the nest is always on the outside of buildings, under the eaves or projecting parts; the eggs are white; it has no song.

SWAMMERDAM, JOHANNES, a Dutch entomologist and physician, born in Amsterdam in 1637, died in 1681. He studied medicine with his father, who was an apothecary, and at the university of Leyden. While occupied with his other studies he gave considerable attention to the natural history of insects, and made many dissections and microscropical examinations and a large collection of specimens. He obtained leave at Amsterdam to dissect the bodies of those who died in the hospital, and invented the mode for the preparation of hollow organs now usually employed in anatomy. He published a "General History of Insects" (1668); "The Natural History of Bees" (1673); and a "History of the Ephemeras" (1675). His entomological collection was divided at his death and sold in small portions to different purchasers. Boerhaave, who edited his works and wrote his life, esteemed his "History of Insects" incomparably superior to any thing that had preceded it. An English translation of his entomological works by T. Floyd was published in 1758.

SWAN, a well known web-footed bird of the duck family, and the type of the sub-family *cygninæ*, embracing some of the largest and most graceful of aquatic birds. The bill and feet are much like those of the ducks, the former being stout, of nearly equal width throughout, and with a comparatively small nail; the neck very long, and the legs short; wings long and powerful, 2d and 3d quills equal and longest, a blow from them having been known to break a man's arm; tail short and rounded; eyes small and near the bill. They perform long migrations, flying in single files uniting at an acute angle; the diet is chiefly vegetable, consisting of grass, roots, and seeds, in search of which they submerge the head only, keeping it under water 3 to 5 minutes at a time; they also devour aquatic worms and insects, young frogs, and probably small fish; the intestines are long, as in the vegetable feeders; they are gregarious at all seasons of the year, awkward on land, but rapid and high fliers; they are remarkably careful to keep their plumage, which is generally white, free from dirt of all kinds. The nest is bulky, of grass and coarse materials, placed on the ground among the rushes and near the water; it is sometimes raised a foot or more to avoid inundations; the male guards the nest, assists the female in the care of the young, and boldly defends them even against predaceous animals and man; the eggs are 5 to 8, and incubation lasts 6 weeks. —In the typical genus *cygnus* (Linn.) the bill is longer than the head, the base covered by a soft skin extending to the anterior half of the eyes, and the nostrils in the middle portion; lower part of tibia bare; tarsus much shorter than the foot, compressed and scaly; webs full; hind toe small, much elevated, with a narrow lobe; tail of 20 to 24 feathers, rounded or wedge-shaped; sexes similarly colored, but the females the smallest. Wagler has divided the old genus *cygnus* into two, *cygnus* and *olor*, according as there is or is not a swollen fleshy tubercle at the base of the bill; in the former also the lamellæ of the edges of the bill are visibly projecting, and in the latter not; in the former belongs the tame swan of Europe, and in the latter the wild swan and both the North American species. The European wild or whooping swan (*C. ferus*, Ray) is 4½ to 4¾ feet long, white, with the head and neck tinged with yellowish, and a black bill, yellowish at the base and without tubercle; it is a winter visitor in Great Britain, migrating northward in the spring to Lapland, Russia, Siberia, &c., where it breeds; the young are brownish gray. The male has a peculiar note resembling the word "hoop," repeated several times in succession, the intensity greatly increased by the convolutions of the windpipe, which, after penetrating the keel of the breast bone to its posterior portion, is bent forward again to the front of this bone before going to the lungs; this anatomical peculiarity is not found in the tame swan, which has a soft and plaintive voice. Though praised by the poets for its gentleness and beauty, it is cruel and vindictive, the males fighting savagely at pairing time, and the female with young attacking every thing which approaches her nest; it can repel any bird, even the eagle, and in fighting the combatants try to drown one another by holding the rival's head under water, often with fatal effect. Though heavy and rather slow fliers, they rise to a great height, uttering a loud, harsh, and trumpet-like note when sailing high in the air; when enraged or alarmed they can swim faster than a man can walk. This bird was sacred to Apollo, and was the bird of the Muses; it was strangely celebrated for its melodious song, especially at the time of its death; the sound of its wings at a distance is loud and not unmusical, and even its harsh scream may appear pleasant to the Icelander and other northern nations, as the flocks arrive in the spring, announcing the end of the dreary winter; but as far as southern Europe is concerned, its song is a mere fable. The flesh is dark and tough, and, though prominent at ancient feasts, was probably more for ostentation than consumption.—The European tame swan (*C. olor*, Gmel.) has a red bill, with black tip and sides, and a tubercle at the base; the trachea has no convolutions. It is generally distributed over Europe and America as an ornamental bird; it was well known to the ancients, and by the poets was sung as the model of grace and the bird of love, and represented as attached to the car of Venus; its flesh was served with great pomp at their public feasts. It is a large and handsome species, a permanent resident in temperate Europe; in Great Britain from remote periods it has been protected by preservative laws, whose infringement was punished by fine and imprisonment; the male is called a cob and the female a pen; its life is said to extend to a century. The young have a gray plumage and a lead-colored bill; their flesh is sometimes eaten at the present day, and when properly cooked is said to be delicious, with a flavor between that of the goose and of the hare. As an ornamental bird nothing is more pleasing than the swan, an emblem of peace, quiet, and refinement, as it swims slowly over the surface of a placid lake. The most prized are brought to the United States from Hamburg, and are generally what are called Polish swans (*C. immutabilis*, Yarr.), from the Baltic shores, noted for having white cygnets. Bewick's swan (*C.*

minor, Pall.) is a smaller, wild species, making considerable noise in its migrations, and a winter visitor in Great Britain.—The American or whistling swan (*C. Americanus*, Sharpless) is 55 inches long and about 7 feet in alar extent, with a bill of 4½ inches; the bill is as long as the head, high at the base, the feathers on the forehead ending in a semicircular outline; the nostrils far forward; tail of 20 feathers; the adult is pure white with bill and legs black, and an orange or yellowish spot in front of the eye; young birds are brownish, especially on the head; they are 5 or 6 years in coming to maturity. This species is spread over the North American continent from the Atlantic to the Pacific; many are shot in winter and spring on the coasts of Virginia, Maryland, and Delaware; they are very watchful when feeding, one always acting as sentinel; they fly in an angle, each line in single file, the leading bird as he gets weary retiring to the rear. The nest is described as made of moss, peat, and sticks, 5 to 6 feet long, 4¾ wide, and 2 high, with the cavity 1½ in diameter; the eggs are brownish white, clouded with darker. The trumpeter swan (*C. buccinator*, Rich.) is about 5 feet long and 7 in alar extent, with the bill 4½ inches; bill longer than the head, the feathers on the forehead with a semi-elliptical outline; nostrils with the anterior extremity only as far forward as the middle of the commissure; tail with 24 feathers; the adults are pure white, the legs and bill entirely black, the latter without any red spot at base. It is found from the Mississippi valley to the Pacific, appearing on the lower Ohio about the end of October, and going south when the ice gets thick; it is very common in the fur countries, breeding as low as lat. 61° N. As its name imports, the note is more sonorous than in the whistling swan; it is not so wary as the last named species; as in all swans, during flight the neck and legs are stretched at full length; it is the principal source of the fine down so much prized for muffs and tippets.—The black-necked swan (*C. nigricollis*, Steph.), of South America, has the head and neck black and the bill red. The *C. coscoroba* (Mol.), also South American, has the lores feathered.—A black swan, once considered as apocryphal as a white crow, inhabits Australia, that land of strange animals; the *chenopis atrata* (Wagl.), of that continent and Tasmania, is black except a few white primaries and a bright red bill; it is nearly as large as the common swan, and is now not unfrequently seen with it in the parks of Europe; its dying note, far from being melodious, is said to be like the creaking of a rusty sign on a windy day.

SWAN RIVER, a river of West Australia, which, after a N. W. and S. W. course of about 180 m., in which it several times expands into small lakes, and after passing near Guilford and the city of Perth, falls into the sea by an extensive estuary about lat. 32° S. It is subject to sudden floods which are often very destructive. Swan river was first discovered in 1696 by Vlaming. In 1829 the colony now called West Australia was founded upon its banks.

SWANSEA (Welsh, *Abertawy*), a town and parliamentary borough of Glamorganshire, Wales, situated on the W. bank of the river Tawy, where it falls into the bay of Swansea, Bristol channel, 84 m. W. from Bristol; pop. in 1861, 42,581. It is much resorted to for sea bathing. There are extensive anthracite mines in the neighborhood, which, together with the convenience of the port, have caused it to be made the principal seat of the copper trade of Great Britain. Copper ore is brought from Cuba, South America, Australia, &c., to be smelted at Swansea. There are iron, tin plate, and zinc works, potteries, &c., and ship building is carried on. In 1859 there were owned here 4,772 vessels, tonnage 508,814. There are extensive docks with every convenience for loading and unloading vessels; and the first floating dock was built at Swansea in 1852. In consequence of the great height to which the tide rises vessels of large size can come close to the town at flood, but at ebb the harbor is nearly dry. Swansea is connected by railway with Milford and Gloucester, and is the terminus of the Swansea Valley railway, opened in 1860.

SWARTZ, Olof, a Swedish botanist, born at Norrköping, East Gottland, in 1760, died in 1817. He studied medicine at Upsal, and between the years 1779 and 1782 made excursions in the various districts of Sweden to study their botany, and visited Lapland, Finland, and Gottland. In 1783 he visited the western coasts of America and the West Indies, and, after spending a year in England, returned to Sweden in 1789, and in 1790 was appointed professor of natural history in the medico-chirurgical institution of Stockholm. He added upward of 50 genera and 850 species to the list of flowering plants, beside a great number to the class of *cryptogamia*. He published botanical works in Latin, wrote the text of 4 volumes of the *Svensk Botanik*, and contributed to the "Philosophical Transactions" and the "Transactions of the Linnæan Society" of London.

SWEABORG, or Sveaborg, a fortress and military post in Finland, belonging to Russia, 3 m. S. E. from Helsingfors, the approaches to which it defends; pop. 6,000. It is built upon 7 granitic islands forming an ellipse, all of them strongly fortified, and connected either by causeways or bridges of boats; they are Vargö and Gustafsvärd on the S., Wester Svartö and Langärn to the N. W., Löven and the Little Öster Svartö to the N., and the Great Öster Svartö to the N. E. The principal fort is on Vargö, and comprises a strong castle and barracks, and magazines excavated in the rock and bomb-proof. There are at some points 3 tiers of guns. The total number of cannon is 2,000, and the usual garrison of the fortress varies from 6,000 to 8,000 men, though the casemates have accommodations for 12,000. The harbor within, to which there is but one entrance, has room for 70 ships of the line. The fortress was erected between 1749 and 1758 by Count Ehrensward, field marshal of Sweden (who is buried within it), as a defence against Russia. In 1808 it was besieged by the Russians, and after 2 months Admiral Cronstadt, though amply supplied with the means of defence, capitulated. Left in possession of the conquerors by the peace of 1809, it was called the "Gibraltar of the North," and has since been regarded as the strongest fortress of Russia on the Baltic. In Aug. 1855, it was severely but unsuccessfully bombarded by the allied fleet.

SWEATING SICKNESS. During the middle ages Europe was ravaged by numerous and fatal pestilences; some of these, after repeatedly decimating every considerable city in Europe, are now confined almost exclusively to Egypt and the Turkish dominions; others have completely disappeared, and left no trace except in the chronicles of the period. Among these latter was the sweating sickness. It made its first appearance in England in 1485, just after the battle of Bosworth, and disappeared suddenly at the commencement of the next year. It attacked chiefly people in the prime of life, avoiding the extremes of old age and infancy, and was so fatal that, according to Holinshed, scarce one in 100 of those attacked escaped with life. It made a second appearance during the summer of 1506, but this time the disease was mild and manageable, so that it was thought that medicine had got the better of it; after a short time it again completely disappeared. In July, 1517, it broke out for a third time, appearing first in London. This epidemic was exceedingly fatal, often carrying off the patient in the course of a few hours, so that the shivering fit was regarded as the announcement of certain death; it lasted for 6 months, and like the preceding ones its ravages were confined to England alone. In May, 1528, the sweating sickness again made its appearance in London. This time the duration of the disease was longer, for it still lingered in England in the following summer; it was very fatal, so much so as to be denominated by some historians "the great mortality;" and finally it extended over the northern half of the continent. It first spread to Hamburg, attacking the crew of an English vessel recently arrived, and in the course of 21 days is estimated to have cut off 2,000 persons. From Hamburg it extended over all northern Germany, reaching as far south as Augsburg, and then making its way gradually to the Netherlands, Denmark, Sweden, and Norway. In 1551 the disease again appeared in England, and, after spreading alarm and death throughout the country for 6 months, finally entirely disappeared.—The sweating sickness occurred when medical science was at a low ebb, and entirely confined within the narrow limits of the Galenic theories; what accounts we have of it are mainly derived from the chronicles of the time rather than from the writings of physicians. Hecker ("Epidemics of the Middle Ages"), from whom our account has been taken, speaks of it as of a form of "inflammatory rheumatic fever;" but he must use the word in a different and much larger sense than is usually given to it. The disease commonly commenced with a chill, accompanied by an alarming prostration. Pain in the head was an invariable symptom; this was soon followed in some by delirium, in others by a lethargy which gradually lapsed into fatal coma. Early in the disease, sometimes at its commencement, the patient broke out in a copious sweat; this had an exceedingly offensive smell, and poured in streams from the patient, so that he "lay, as it were, in a stinking swamp." The pulse was quick and feeble, the breathing labored, the countenance livid, and the patient restless, constantly tossing and throwing himself about. Sometimes nausea and vomiting were present, sometimes convulsions came on; the voice was "whining and sighing;" "neither the activity of the kidneys nor the evacuation by stool was entirely interrupted." The crisis of the disease occurred commonly within 24 hours, and many died within that time; if they survived it, recovery gradually took place; but the patient was left in a very feeble condition, and the convalescence was tedious and protracted. Relapses were common, even to a 3d and 4th attack; in these cases organic changes probably took place, for the patients are said to have died of dropsy or some other incurable affection. The disease was probably contagious, as it seems to have followed the great channels of commercial intercourse. Its propagation was favored by the personal uncleanliness, the want of ventilation in dwellings, the starvation, and the excesses common at the period; and its mortality was aggravated by the injudicious means employed for its cure.

SWEDEN (Swedish, *Sverige*), a kingdom of northern Europe, forming with Norway, with which it is politically united, the Scandinavian peninsula, and lying between lat. 55° 20′ and 69° N. and long. 11° 18′ 30″ and 24° 18′ E. It is bounded N. and W. by Norway, S. W. by the Cattegat and the Sound, S. by the Baltic sea, E. by the Baltic and the gulf of Bothnia, and N. E. by Finland. It is separated from Norway by the long range of mountains forming the main chain of the Scandinavian system, along which a broad avenue cut in the forest, and having at certain intervals stone monuments, marks the line of division. This avenue is maintained with great care and kept free from obstructions by the Norwegians, and its condition regularly reported to their *storthing* or legislature. The extreme length of Sweden is 970 m., and its average breadth about 200 m. It is divided into 3 provinces: Gottland, Svealand, Swedeland, or Sweden proper, and Norrland. These are subdivided into 24 læns or districts, whose extent and population were in 1858 as follows, according to the *Almanach de Gotha* for 1862:

Læns or districts.	Area, sq. m.	Population in 1858.	Chief towns.
GOTTLAND.			
Malmö	1,789	276,509	Malmö.
Christianstad	2,444	201,440	Christianstad.
Blekinge	1,118	114,647	Carlscrona.
Kronoberg	3,801	147,220	Wexiö.
Jönköping	4,308	165,664	Jönköping.
Calmar	4,268	216,543	Calmar.
Östergottland	4,269	233,867	Linköping.
Halland	1,908	115,283	Halmstad.
Skaraborg	3,301	214,051	Mariestad.
Elfsborg	5,052	261,850	Wenersborg.
Gothenburg	1,911	206,128	Gothenburg.
Gottland	1,231	49,193	Wisby.
Lakes Wener and Wetter	2,867	....	
Total	38,268	2,202,395	
SVEALAND.			
Stockholm	2,929	211,830	Stockholm.
Upsal	2,095	91,877	Upsal.
Södermanland	2,516	124,801	Nyköping.
Westmanland	2,637	99,707	Westeras.
Örebro	3,275	146,043	Örebro.
Wermland	6,966	237,265	Carlstad.
Kopparberg	12,299	162,004	Falun.
Lakes Mælar and Hjelmar	736	....	
Total	33,447	1,095,201	
NORRLAND.			
Gefleborg	7,563	131,986	Gefle.
Westernorrland	9,540	112,820	Hernosand.
Jämtland	19,191	58,754	Östersund.
Westerbotten	20,168	79,485	Umea.
Norrbotten	42,454	66,833	Pitea.
Total	98,911	449,828	
Total of Sweden	170,626	3,784,240	

Gottland (the region originally inhabited by the Goths) lies S. of lat. 58° 45′, and comprises also the islands of Oland and Gottland; Svealand, the original country of the Svenskar or Swedes, is the middle region of the kingdom, extending from Gottland northward to lat. 60° 40′; and Norrland is the whole northern section up to the Norwegian frontier of Finland. —The coast line, which is about 1,400 m. in extent, is deeply indented by numerous *fiords* or gulfs, which penetrate far into the interior of the country; about 300 m. of the coast borders on the Skager Rack, Cattegat, and Sound; the remainder is washed by the Baltic and the gulf of Bothnia. The W. shore along the Skager Rack and Cattegat is rocky, but seldom elevated more than 30 or 40 feet. The S. shore as far as Sölvitsborg in Blekinge is low and sandy; thence northward it is, with some exceptions, lined by precipitous cliffs about 50 feet in height as far as Calmar sound, lying between Oland and the mainland. The bay of Carlscrona makes a deep indentation in this portion of the coast. Along the Sound the coast is again low and sandy, but north of it rises into higher cliffs, and at the outlet of Lake Mælar presents bold headlands 100 feet in height. Above the mouth of the Dal and as far as the strait of Quarken the rocky and sandy shores alternate; while the upper part of the gulf of Bothnia is characterized by low sandy beaches. The rivers are numerous, and mostly of rapid current. The principal are the Tornea, 290 m. long, and with its affluent the Muonio forming the boundary between Sweden and Finland; the Lulea, Pitea, Skelleftea, and Umea; the Angerman, a broad and deep stream 230 m. long, and navigable for vessels of 600 tons 70 m. from its mouth; the E. and W. Dal, which uniting form the outlet of several lakes; these all fall into the gulf of Bothnia. The Klar and the Göta discharge their waters into the Cattegat. The Trolhätta fall on the latter is celebrated; the quantity of water is very large and the descent 112 feet. Sweden abounds in beautiful lakes; over 80 are enumerated. The largest is Lake Wener, 90 by 56 m. in extent, and the largest lake in Europe except Lake Ladoga. Lake Wetter is smaller, but has an area of nearly 720 sq. m., and receives 40 rivers. Lake Mælar is an arm of the sea, with beautiful banks, and contains, it is said, 1,400 islands. The other principal lakes are the Hjelmar, connected with Lake Mælar; the Silja, the Storjan, the Horn-Afvan, and the Stora-Lulea-Watten, in which the Lulea river has its source.—The mountain chain which forms the spine of the Scandinavian peninsula, and which is collectively known as the Dovrefield or Dofrines, has a much larger portion of its most elevated surface in Norway than in Sweden. Its lower portion, the Langfield chain, is wholly in Norway, while the Dovrefield and Kiölen chains form the boundary between the two countries; their loftiest summits, Sulitelma in lat. 67° and Sylfjellen in lat. 63°, lie partly in each. The western or Norwegian side of these mountains has a much more precipitous character than the eastern or Swedish. In Sweden they form a plateau nearly 4,000 feet high, from which occasional peaks rise to a greater height, but which in a breadth of 40 m. slopes gradually to an elevation of from 800 to 1,000 feet, and thence declines in hills of moderate elevation to the sea shore. S. of lat. 59° the country is very level, and the great plain of Scania, the most fertile tract of the peninsula, occupies a considerable portion of the southern extremity. The northern part of Sweden is rocky, with bleak, barren, snow-clad hills, and a stunted vegetation of birch, fir, and small pines, in the higher lands intermingled with dreary lakes and swamps. The great forest region lies S. of lat. 64°, where the surface is less elevated. It is computed that ⅘ of the territory of the kingdom is covered with forests. Further S. the surface is more level, and the woods give place to cultivated fields.—The geological formations of Sweden are in chief part granites, gneiss, and metamorphic rocks. They compose most of the Scandinavian chain of mountains, and are in many places covered with silurian strata, which sometimes are seen undisturbed from their original horizontal position. These are broken through and overflowed by trap; and the surface is generally covered with the drift formation and large bowlders. The metamorphic group abounds in metallic veins which constitute a large portion of the wealth of the country, and are productive in a great variety of metals, as iron, copper, lead, zinc, silver, cobalt, &c. The pyritiferous slates are largely worked for alum and copperas, and these, as well as the sulphurous gangues of the various ores, might be made to furnish unlimited supplies of sulphur. The production of the metals is variously given by different authorities, and has been noticed in the tabular statement in the article Mine, as also to some extent under the heads of the different metals. The localities of the most important mines are: of iron, at Dannemora in the læn of Upsal, and in Wermland, Örebro, Gefleborg, Kopparberg, and Westmanland; of copper, at Falun in Kopparberg, and at various other places in the læns of Östergottland, Jämtland, Westmanland, &c.; and of silver at Sala, in Westmanland. It is stated that the silver mine at this place in 1850 produced 805,000 oz. of silver. Coal of inferior quality is found in the S. part of Sweden, near Helsingborg. An interesting geological change in the coast line of Sweden, caused by the gradual rising of the land, has been noticed as taking place ever since it was first observed by Celsius in the early part of the last century. By him it was attributed to the depression of the waters of the Baltic. The greatest movement is noticed along the N. coast, and has been rated at about 6 inches in 100 years. It is much less at Stockholm, and gradually decreases further south.—The soil of Sweden is not generally very fertile, much of it being produced by the disintegration of primitive rocks, and containing a large proportion of silex. There are nearly 4,000 sq. m. of arable lands, and somewhat more than 7,000 of meadow lands and pasturage, so that in all not far from $\frac{1}{13}$ of the surface of the kingdom is under cultivation. The climate of the Scandinavian peninsula is generally milder than that of other countries in the same latitude; the E. is about 2° colder than the W. side, but the winter is 5° warmer and the summer 1° colder. In the S. there are scarcely 5 months of rigorous winter, and the general temperature of this section differs but little from that of the N. of France or of N. Germany. At Stockholm, in lat. 59° 20′, the mean annual temperature is 42°, that of winter 25° and of summer 62°; at Lund, lat. 57° 42′, the annual mean is 45°, that of winter 29.54° and of summer 62°; in Falun, lat. 60° 39′, the annual mean is 40°, that of winter 22° and that of summer 58.33°; and in Enontekeis, lat. 68° 30′, and at an elevation of 1,440 feet, the annual mean is 27°, the winter temperature 1.49° and the summer 54.61°. In Swedish Lapland there are scarcely 2 months of summer, which has been described as follows: "On June 23 the snow begins to melt; on July 1 it disappears; on the 9th the fields are covered with grown grass; on the 17th grain crops are in full growth, and on the 25th in full flower; on Aug. 2 fruits are ripe; on the 9th harvest is over; and on the 18th it snows." In Norrland, in the space of 9 weeks, hay will have been cut twice and the year's seeding and harvest completed. At Stockholm the longest day is 18½ hours and the shortest 5½ hours. At Tornea, 21½ hours is the longest; and at Enontekeis, lat. 68° 30′, the sun remains above the horizon about 8 weeks.—The pine and fir forests of Sweden furnish a great abundance of timber, which is largely exported for building and shipping purposes. In the middle province there are also considerable quanties of ash, linden, willow, maple, and the weeping birch, one of the most beautiful of northern forest trees. In the southern province the oak attains great size and beauty, and the beech and elm are common. With the exception of the cherry there are few fruit trees N. of the 60th parallel. Barley is cultivated in all parts of Sweden, and rye, wheat, oats, beans, peas, and potatoes are successfully grown in the middle and southern provinces. The gooseberry grows as far N. as 70°. Tobacco is raised in the vicinity of Stockholm. Root crops are largely cultivated.—The fauna of Sweden is not as numerous as of some of the other northern countries of Europe. The principal quadrupeds are the brown bear, wolf, lynx, fox, glutton, lemming, deer, elk, marten, hare, sable, beaver, and squirrel. The birds are more numerous, sea fowl especially seeking the sheltered coasts of the Baltic and gulf of Bothnia. The eagle and falcon, the wild goose, eider duck and other species of wild ducks, swans, and the gull tribe abound; and on the heaths the woodcock, capercailzie and other grouse are plentiful. Among fishes, the herring, or rather the *strömming*, an allied genus, are plentiful on the S. coast, and the turbot, oyster, lobster, salmon, and trout are found in great numbers in the seas and rivers. The domestic animals are mostly of small size, and, though hardy, the cattle and sheep are of inferior quality. In the north the reindeer and dog are used to some extent for draught.—The Swedes are a branch of the old Scandinavian or Norse stock. They constitute the greater part of the population, though the districts of Westerbotten and Norrbotten are principally inhabited by Finns and Lapps, who together number about 150,000. The Swedes are, like the other Scandinavian races (the Danes and Norwegians), tall and of a sandy or florid complexion, and powerful *physique*. They are divided into 4 classes, the nobility, clergy, burghers, and peasants. The Swedish aristocracy is among the oldest in Europe, and now consists of about 2,400 families, numbering in all nearly 11,000 persons. They were formerly very wealthy, and possessed ½ of the landed property of the kingdom; but many of them are now very poor, though their pride is such that they will not compromise themselves by engaging in commercial or industrial pursuits. They are the principal officeholders of the realm. The clergy number with their families about 15,000 persons; 1,300 are beneficed clergymen, and about 1,900 professors, teachers, or assistants to the pastors. The class of burghers comprises about 70,000 persons, and are members of the various guilds, or iron manufacturers, or have been parochial magistrates; they hold real estate of the value of about $15,000,000. The peasants comprise about 2,800,000 of the population, and possess landed property to the amount of about $75,000,000. They are industrious, prudent, and well educated, and are gradually absorbing the landed property of the kingdom, especially that from the encumbered demesnes of the nobility. There is also a class belonging to neither of these estates, comprising nearly 900,000. The Swedes are an enterprising, energetic, and thrifty people, but have hitherto been addicted to some vices which have seriously marred their character. Drunkenness, from immoderate potations of their fiery corn brandy, has been more common than in any other country in Europe, and was productive of a large amount of crime; but there has been a great improvement in this respect in the last 12 years. Owing to the religious excitement propagated by the *Läsere* or Readers and other dissenting sects, and the formation of numerous temperance societies, intemperance has greatly diminished, and crime with it. The consumption of distilled spirits, which in 1840 was over 30,000,000 gallons, and in 1850 nearly 40,000,000, had diminished in 1861 to about 10,620,000 gallons. Illegitimacy has been fearfully prevalent in Sweden for many years. Houses of prostitution were not suffered to exist; but unchastity, or at least indifference to marital obligations, prevailed to such an extent that in 1849 in Stockholm the proportion of illegitimate to legitimate births was as 1 to 2.27; in other towns as 1 to 5; in the whole kingdom as 1 to 11. In this respect, too, it is said that the past few years have witnessed a decided change for the better.—More than ⅘ of the population are engaged in agricultural pursuits, a considerable number in navigation and commerce, and a small body, mostly from the burgher class, in manufacturing and trade. During the past 40 years Sweden has made a great advance in agriculture. The government has done much to encourage it, and the establishment of agricultural schools and model farms, and the introduction of improved implements, have been of great service. Though the soil is sterile and yields grudgingly, and so much of it is still covered with the primeval forests, yet the cereals, formerly articles of import, are now exported in considerable quantities; in 1858 this export (principally of oats and barley) reached the amount of 4,800,000 bushels. Barley is raised in all parts of the kingdom, rye to the 66th, oats to the 64th, and wheat to the 62d parallel of latitude. There is an abundance of pasturage for cattle, sheep, and goats in the summer, but the long winter requires them to be so long housed as materially to diminish the profit of raising them. In 1855 there were 1,921,568 horned cattle, 1,792,070 sheep, and about 400,000 horses in the country.—Sweden has made great progress in manufacturing industry within the past few years. While the number of distilleries, of which in 1835 there were 85,172 small and 670 large ones, had diminished in 1858 to 2,478 small and 326 large ones, and has since still further decreased, other branches of industry have greatly increased. There are 2 very large manufactories of steam engines, iron steamers, &c., one at Motala employing 800 men, and another at Norrköping employing 400; and extensive saw mills, paper mills, cutlery shops, and manufactories of cotton, woollen, linen, and silk stuffs, sail cloths, hardware, glass, earthenware, clocks and watches, &c. The amount of goods produced in the registered manufactories of the country in 1839 was $5,493,123; in 1850, $9,891,072; in 1854, exclusive of the engine works, saw mills, and paper mills, over $11,841,613; in 1855, $14,437,645. These amounts include none of the homespun fabrics so largely produced in Sweden, and which rival in fineness and beauty those of the registered factories. The district most remarkable for these is Elfsborg, containing 261,850 inhabitants, and which produced in 1855, over and above the quantity consumed by them, 9,047,506 yards of cotton cloth, 1,568,556 cotton handkerchiefs, 260,000 yards of linen cloth, and 392,425 yards of woollen goods. In Gefleborg, containing but 181,936 inhabitants, 1,384,666 yards of heavy linen cloth were produced in the families.—There has been great confusion in regard to the money, weights, and measures of Sweden, which has recently been terminated by the adoption of a decimal system, passed by the diet of 1854 and put in operation Jan. 1, 1858. The unit of money has been from time immemorial the *riksdaler* (government dollar). The various wars prior to 1815 depreciated the Swedish paper money greatly, and the government notes were of less value than those issued by the bank, which was an independent institution, though under the management of directors appointed by the legislature. The specie dollar was 106 cts., the *riksgalds* (royal debts) dollar 26½ cts., or 4 to the specie dollar; while the *riksdaler banco*, or bank dollar, was 39¾ cts., or ⅜ of the specie dollar and 1½ of the riksgalds. The riksdaler banco hence became the official money of accounts. All three (the specie, banco, and riksgald) were divided into 48 *skillings*, and the skilling into 12 *rundstyks*. The new currency adopts the riksgald dollar (26½ cts.) as the unit, calling it the *riksmynt* dollar, and divides it into 100 *öre*. All future accounts are to be in this money, and the currency for foreign coins will be quoted in riksmynt money at so much per 100 of the foreign coins, except the pound sterling, which is quoted per £. The silver coins, which are 3 parts silver and 1 copper, are in pieces of 1, 2, and 4 riksmynt dollars, and pieces of 10, 25, and 50 öre. In weights a similar reform has taken place, the Swedish pound or unit of weight being 0.937 of an English pound. In length, 100 English yards (= 300 feet) contain 308 Swedish feet, or 1 English foot equals

1.026 Swedish. One English acre contains 4.59 Swedish *quadratref;* one gallon 1.446 *kaus;* 1 bushel 1.762 Swedish cubic feet. The Swedish mile is equal to 6.6235 English miles.—The commerce of Sweden has been increasing in importance for some years past, the injurious restrictions formerly imposed upon it by the government being removed. The following table gives the imports and exports for the 5 years ending with 1859:

Years.	Imports.	Exports.	Total.
1855..........	$22,624,000	$25,559,200	$48,183,600
1856..........	28,225,200	24,648,800	52,874,000
1857..........	34,116,000	31,369,600	65,485,600
1858..........	15,083,800	15,604,260	30,688,060
1859..........	19,673,865	20,846,755	40,520,610

The trade with the United States in 1855 was: imports, $776,400; exports, $762,400; together, $1,538,800. In 1859 the imports had increased to $1,462,270, while the exports remained nearly the same. The total imports of 1859 included cotton (of which 11,662,859 lbs. was from the United States), coffee, wheat, flour, rye and rye flour, tobacco (1,848 hhds. and 480,000 cigars from the United States), sugar, tools and machinery, hides, wool, tea, &c. The exports were alum, bar and pig iron and steel (to the value from the two ports of Stockholm and Gothenburg of $4,615,239, of which $512,337 came to the United States direct), timber (spars or beams and plank), breadstuffs (mainly barley, rye, and oats), tar, bones, and linseed cake. The following table exhibits the growth of the Swedish commercial marine during the last 65 years:

Years.	No. of vessels.	Tonnage.	Mariners.
1795..................	721	92,000	6,271
1810..................	852	103,796	7,542
1820..................	819	103,630	6,862
1830..................	1,341	144,148	7,579
1840..................	2,171	175,553	7,944
1850..................	2,744	225,966	9,838
1856..................	3,020	277,586	10,669
1859..................	3,364	314,912	....

This is exclusive of vessels employed in internal navigation, on the canals, lakes, &c., which in 1855 were 1,676, measuring 65,186 tons. The number of merchant steamers the same year was 131, of 5,927 horse power. There are 4 large canals in Sweden: the Götha or Göta canal, connecting the Cattegat with the Baltic, by the Göta river and Lakes Wener and Wetter, with the Trolhätta canal as a portion of it, which avoids the Trolhätta fall, having a total length of about 260 m.; the Hjelmar or Arboga canal, connecting by the Arboga river Lake Hjelmar with Lake Mælar; the Södertelge canal, connecting Lake Mælar with the Baltic; and the Stromsholms, connecting the same lake with the mineral region of Dalecarlia. The first railroad, that between Nora and Örebro, 23 m. long, was opened in 1856. There are now also lines from Dylta to Arboga, 12 m. long, between Malmö and Lund, between Stockholm and Gothenburg, and from Gefle to Falun. The whole extent of railroad lines opened exceeds 200 m.—Elementary education is universal in Sweden. For nearly 200 years the ability to read and write has been indispensable to the assumption of the functions of citizenship. In 1842 an attempt was made to establish a school in every parish, but the northern districts are so thinly peopled that it has been found necessary to resort to ambulatory schools in them, the teacher gathering a group of pupils at a farm house and teaching them for a few weeks, and then passing on to another neighborhood to repeat the process. In 1850 there were 143,526 children receiving instruction in parochial schools, 126,178 in ambulatory schools, 6,228 in public schools, 17,465 in private schools, and 128,996 at home; total, 422,393. There are also in most of the towns gymnasia or collegiate schools for preparing students for the universities. There are normal schools for the training of teachers at Stockholm and Gothenburg, and two universities of high repute at Upsal and Lund. The former dates from 1477, and the latter from 1668; and the two have over 2,000 students.—The Lutheran church is the established church of Sweden, and but a limited toleration is granted to dissenters. The clergy are a powerful body, having an equal voice with the peasantry or the burghers in the national diet, and, with the nobles, to whom they are generally affiliated, possessing a controlling influence in the government. They are in the main a very moral and intelligent class, but extremely intolerant. They not only perform the duties of pastor and preacher, but are usually in the country parishes magistrates also. They have unlimited control over the national education of the country, which is under the immediate direction of each diocesan consistory. The head of the church is the archbishop of Upsal, and there are 11 bishops. The archbishop and bishops are nominated by the king from a list of candidates presented by the dioceses. From permanent funds, tithes, fees, &c., the clergy generally receive a very liberal income. No one but a member of the established church can hold office, and apostates from the national creed are liable to fine, imprisonment, confiscation of property, and banishment. If dissenters can obtain an authorization from the king, they may form societies, which will be recognized and tolerated. The periodical and newspaper press in Sweden exerts a powerful influence. There are several well conducted journals in Stockholm, and one or more newspapers in every considerable town of the kingdom. In 1850 the whole number of journals was 113.—The government of Sweden is a limited monarchy, hereditary only in the male line. The king is, in the language of the constitution and laws, the state, and is sole governor of the realm and commander of the land and sea forces. Upon his pleasure depend all military, civil, and ecclesiastical appointments. His action is exempt from all censure, but he is required to advise and consult with a council of state of 10 members, 2 ministers of state and 8 state councillors, all of whom must be native Swedes. He is not bound to follow their advice, but if he proceeds to unconstitutional measures they must make a formal protest, or they are held responsible before a high court convened for their trial. The king may not interfere with the course of legal trial, nor can he pardon a convict without the consent of the latter. In practice, the king submits all measures except purely military and diplomatic affairs to his council. During the absence of the king in Norway, Sweden is governed by a regency named by him, and consisting of a prince of the blood or a minister of state and 3 councillors. In his absence from both kingdoms, or the minority of the sovereign, the two kingdoms are governed by a joint regency of 10 Swedes and 10 Norwegians. The law-making power is vested in the 4 estates of the realm, which are coeval with King Magnus Ericsson (1319). The house of nobles numbers about 900 members, of whom 300 usually assemble, the house of clergy about 54, and the house of burghers 60; and the house of peasants has 1 representative for every 21,000 constituents, making its number about 133. Each house has a separate and equal vote. Various attempts have been made to change their inequality of representation, but the nobles and clergy have always defeated them. The unrepresented class, nearly 900,000 in number, comprises those whose social positions are not in either of the 4 estates, and includes a large proportion of the scholars and men of science of the kingdom. The king has an absolute veto upon the acts of the diet or session of the "four houses," and may dissolve their sittings at his pleasure. The fundamental laws (viz.: the constitution of June 6, 1809; the arrangement of the diet of Feb. 10, 1810; the law of succession of Sept. 26, 1810; and the regulation of the liberty of the press of July 16, 1812) and the privileges of each order cannot be changed without the consent of all the orders of the states-general. In all other questions the votes of 3 of the orders decide. The sessions of the diet are triennial. The judiciary consists of the supreme court of the kingdom, composed of 16 judges in 2 divisions, which interprets the laws and renders justice in the name of the king, who may be present and is allowed 2 votes at its sittings; 3 royal courts of justice, at Stockholm, Jönköping, and Christianstad; a royal court of military justice; and a supreme court of admiralty. There are also petty courts throughout the kingdom, and the clergy are often magistrates of these. The estimate of receipts and expenditures of the Swedish administration for each of the 3 years ending Jan. 1, 1862–'3–'4, is as follows:

ANNUAL RECEIPTS.

Ordinary		$2,155,841
Extraordinary—Customs	$2,941,500	
Excises	106	
Posts	871,000	
Stamps	354,500	
Brandy	1,355,000—	5,522,106
Total		$7,677,447

ANNUAL EXPENDITURES.

Royal household	$338,776	
Justice	562,621	
Foreign affairs	126,988	
War	2,312,846	
Marine	875,851	
Interior	584,842	
Finances	1,131,669	
Public instruction and worship	868,246	
Pensions, &c.	309,764—	7,131,603
Annual excess of receipts		$545,844

An extraordinary expenditure of $2,335,967 per annum, for the construction of railroads, is provided for by special taxes, the excess of ordinary receipts, and other resources. The produce of government lands does not for the most part come into the budget, but is applied to the support of the army and certain of the civil functionaries. The army of Sweden is composed as follows: 1, enrolled troops (*værfvade*), who are recruited by volunteers usually enlisted for 6 years; 2, military colonists or troops in cantonments, who are exercised 4 weeks in a year, and have a house and lands furnished by government, and receive pay in money only when in active service; 3, militia of Gottland; 4, troops of the conscription. All Swedes of from 20 to 25 years are liable to military service. The entire force, exclusive of officers, is: enrolled troops, 7,692; militia of Gottland, 7,621; military colonists, 33,405; conscripts, 95,295; total, 144,013. The navy of Sweden consists of 10 vessels of the line, 6 frigates, 4 corvettes, 4 brigs, 9 steam corvettes, 20 war schooners, 77 gun boats, 122 gun launches, 6 mortar vessels, 22 small steam gun boats, 2 royal yachts, 21 transports, and 594 launches propelled by oars; in all 897 vessels. —The early history of Sweden is even more confused and mythical than that of Norway or Denmark. (See DENMARK, NORTHMEN, NORWAY, and ODIN.) The realm founded by Odin and his Sviar or Swedes comprised probably only a portion of the central province or Svealand, and his capital Sigtuna was on or near the site of the present village of that name. The Odin dynasty ended with Olaf the Wood-Cutter, who was driven from power prior, it is supposed, to the 9th century, and his conqueror, Ivar, succeeded to the Swedish throne. After an uncertain period of tradition and fable, we find St. Anscarius visiting Sweden in 830, and preaching in the presence of King Biörn of the Hill to the pagan Swedes. Anscarius made some converts, but it was not till about the year 1000 that Olaf Skotkonung (the lap-king, so called from receiving homage while an infant) established Christianity as the national religion, and was himself baptized. Paganism was not fully expelled from his kingdom, however, for many years. Constant disputes and often open war followed for the next 3 centuries between the Goths and Swedes. In 1129 Inge II., king of Svealand or Swedeland, died, and the Swedes conferred the royal dignity on a private individual, Swerker I.; but as there was a claimant descended from a female branch of the royal family, named Eric, who was supported by the Goths, the Swedes agreed that Eric should succeed Swerker, and that henceforth the representatives of each of the two families should reign alternately, assuming the title they still maintain of "king of the Swedes and Goths." Waldemar, son of Earl Birger (Birger Jarl), the founder of Stockholm, was elected king in 1250. In 1279 Magnus Ladulas (Barnlock, so called from his faithful guardianship of the people's granaries) ascended the throne, and reigned with extraordinary ability and justice till 1290, when he died while making preparations to start on a crusade. His death was succeeded by a long period of dissension between his 3 sons; in 1319 Magnus Smeck, then an infant, became king, and subsequently by right of his mother succeeded to the throne of Norway. He was deposed by the diet in 1348, and his son Eric elected his successor; but on Eric's death in 1359 he was restored. He established his son Haco in Norway, and induced him to marry Margaret, daughter of Waldemar, king of Denmark. The 3 Scandinavian states being thus allied, he attempted by the aid of the kings of Norway and Denmark to become absolute by abolishing the senate, but was deposed and Albert of Mecklenburg elected king. A war ensued between him and the kings of Denmark and Norway, which ended in Albert's defeat, and on July 20, 1397, by the "union of Calmar," Margaret, "the Semiramis of the North," became queen of Sweden, Norway, and Denmark. She retained possession of the triple government till her death in 1412, and was succeeded by her grand-nephew Eric of Pomerania. The union of Calmar was maintained with great difficulty for a little more than 100 years, though in 1436 it was seriously perilled by the efforts of the Swedes under the leadership of Engelbert, a patriotic Dalecarlian miner, and but for his assassination by the treachery of a Swedish noble in that year would have been overthrown. In 1442 Eric was deposed, and his nephew Christopher, duke of Bavaria, chosen king; and on his death in 1448 Canutson, who had been regent at the deposition of Eric, succeeded him. Denmark and Norway revolted, and when after a long war their revolt was quelled, Sweden rose against him. He died in 1470, and a condition of anarchy ensued till 1520, when the people, exasperated by the cruelty of Christian II. of Denmark, found a leader in Gustavus Ericsson, a noble of high rank, better known as Gustavus Vasa. (See Gustavus I.) Christian had murdered, under circumstances of great atrocity, Sten Sture, at that time regent of Sweden, and had hanged as traitors 80 of the principal nobles, among them the father of Gustavus Vasa, and a great number of peasants. The resistance of the Swedes under Gustavus to the government of the Danish king was successful, and in 1523 they elected their leader king. At his death in 1560 he was succeeded by his son Eric XIV., who was deposed on account of alleged insanity in 1568 by his brother John. (See Eric XIV.) John reigned till his death in 1592, when his son Sigismund, who had been elected king of Poland and had become a Roman Catholic, succeeded him, the late king's brother, Duke Charles, being regent till he could leave his kingdom of Poland. Sigismund determined to establish Romanism in the kingdom, against the will of the people, and showed himself so cruel, reckless, and unscrupulous, that in 1604 he was deposed and his uncle Charles IX. was raised to the throne. His reign was one of tranquillity in the kingdom, and in 1611 he died, leaving the throne to his son, the celebrated Gustavus Adolphus. (See Gustavus II.) After a reign of 21 years, the greater part of which was spent in constant war with Poland, Russia, and Germany, while his affairs at home were managed successfully by the wise Oxenstiern, he was slain at the battle of Lützen in 1632, and his daughter Christina, then 6 years of age, succeeded him. (See Christina.) Oxenstiern was invested with the chief management of affairs, and the kingdom for a time prospered, and by the peace of Westphalia in 1648 received considerable accessions of territory. After Christina's coming of age, her love of pleasure soon plunged the country into debt and trouble, and in 1654 she abdicated in favŏr of her cousin Charles X. His reign of 6 years was marked by brilliant battles and acts of great personal bravery, one of which, his crossing the Great Belt with his troops on the ice, is unrivalled in military daring, and enabled him to dictate terms of peace to the Danes at the gates of Copenhagen; but his victories brought no advantage to Sweden, and only wasted her resources. He died in 1560, and was succeeded by his young son Charles XI., during whose minority a peace was concluded by which the kingdom had 10 or 12 years of tranquillity. In 1676 commenced a war with the elector of Brandenburg and the Danes, which was continued with varying success, though for the most part with disaster, till 1679, when the peace of Fontainebleau, leaving the Danes at the mercy of the Swedes, enabled the latter to regain more than they had lost. An advantageous peace was concluded between the two kingdoms, and confirmed by the marriage of Charles to Ulrica, the daughter of the Danish king. During the remainder of his life he devoted his attention assiduously to the settlement of the troubles existing between the nobles and the peasants, and in 1693 prevailed upon both parties to give him the power to alter the constitution as he pleased. He died in 1697, bequeathing to his son Charles XII. this absolute power. (See Charles XII.) The warlike career of this remarkable but reckless king well nigh reduced his country to ruin. At his death in 1718, his sister Ulrica Elenora, wife of Frederic of Hesse-Cassel, after renouncing absolute authority and accepting a constitution from the nobles which restored their power, was elected by the diet to the succession. She soon resigned in favor of her husband, who recovered Pomerania from Denmark in 1720, only by the payment of 600,000 crowns and the renunciation of all claim to exemption from the Sound dues. The next year he was forced to cede to the czar Livonia, Ingria, Esthonia, part of Karelia, Viborg, and the islands of Dago and Oesel. The king exerted himself to promote commerce and industry, and thus regain for Sweden some portion of its former consideration, which the reckless wars of its former kings had taken from it, but with only partial success. He died childless in 1751, and was succeeded by Adolphus Frederic, bishop of Lübeck, through the influence of the empress of Russia, who in consequence relinquished all the conquests she had made from Sweden except a small district in Finland. French influence corrupted the senate during his administration, and involved the country in a disastrous war with Prussia. After a turbulent reign of 20 years he died in 1771, and was succeeded by his son Gustavus. (See GUSTAVUS III.) The revolution of August, 1772, by which Gustavus attained absolute power, and the wars which followed with Russia and Denmark in 1787, and the act of safety of 1789, which abolished the senate, were the most marked events in the Swedish history of that time. He was assassinated in 1792, and his son Gustavus IV. (see GUSTAVUS IV.) ascended the throne; but being a minor, his uncle the duke of Sudermania was appointed regent. In 1809 his imprudence, and the tendency to insanity which he manifested, led to his compulsory abdication, and the duke of Sudermania was declared king under the title of Charles XIII. (See CHARLES XIII.) The peace made with Russia at this time deprived Sweden of Finland, one of her most valuable possessions. A new constitution, that still in force, was decreed, and the prince of Holstein-Augustenburg was elected heir to the throne as crown prince. The assassination of this prince in April, 1810, led very unexpectedly to the nomination of Bernadotte, prince of Ponte Corvo (see BERNADOTTE), as crown prince, whose success in securing Norway to Sweden endeared him to the people. In 1818, on the death of Charles XIII., he ascended the throne as Charles XIV. During his reign Sweden prospered, commerce, the arts, and manufactures made rapid progress, and the moral and social condition of the people was greatly advanced. His son Oscar I. succeeded him at his death in 1844, and encouraged the moral, social, and political progress of the country. He was esteemed one of the most accomplished monarchs of Europe. At his death in 1859, he was succeeded by his son, the present monarch, Charles XV., who had been regent of the kingdom since 1857 in consequence of King Oscar's illness. During the Crimean war Sweden and Norway remained neutral, but in a treaty with France and England bound themselves, in return for a guaranty of protection against encroachment, never to cede territory to any power without the consent of the contracting parties.

SWEDEN, LANGUAGE AND LITERATURE OF. The Swedish is one of the Scandinavian tongues, and as such belongs to the family of the Indo-European languages. Its immediate parent is the Icelandic or Old Northern, the primitive speech of the whole Scandinavian peninsula and of Denmark, and the language of the runic monuments which were erected throughout northern Europe between 900 and 1300. The grammatical forms and vocabulary of the parent tongue have been much better preserved in the Swedish than in the Danish, another daughter of the Old Northern. The line which separates the Swedish from the Icelandic is an arbitrary one, drawn through the middle of the 13th century. In its earlier stages the Swedish was influenced by the German through the commercial connection of Sweden with the Hanseatic towns, by the Latin through the Catholic priesthood and the monastic institutions, and by the Danish through the political union of Sweden and Denmark subsequent to the pact of Calmar (1397). The reformation again subjected it to Teutonic influences, but it was less affected by them than was the Danish. The language was greatly purified and a multitude of foreign vocables driven out by the efforts of the zealous Icelandic scholars of the latter half of the 17th and first quarter of the 18th century. But later in the last century the French tastes prevalent at the court and in the literature introduced a large number of Gallic words, many of which, however, have been since superseded by genuine Scandinavian derivatives. It has 28 letters, the same as in English, with the omission of *w* and the addition of *ä*, *å*, *ö*. Formerly the German character was mostly used in Swedish works, but now the Latin character prevails, though the former is still sometimes to be found. A letter peculiar to the Swedish is *å*, which is pronounced almost like the English *o* in *note*. The vowels *a*, *e*, *i*, *ä*, and *ö* are pronounced as in German; *o* has 2 sounds, either similar to that of the English *o* in *move*, but intermediate between *o* and *u*, or equivalent to the English *a* in *fall*. The sound of *u* is intermediate between the German *u* and *ü*. *Y* is pronounced almost like the German *ü*. The pronunciation of the consonants is not so uniform as in German, but less variant than in English and French. *G* before *e*, *i*, *y*, *ä*, *ö*, has a sound like the English *y* in *you*. *K* before *e*, *i*, *y*, *ä*, *ö*, is soft and pronounced like *ch* in *much*. *Sk* before the same letters, and the combinations *skj*, *sj*, *stj*, are pronounced like the English *sh*. The indefinite article *en* (masc. and fem.) and *ett* (neut.) is placed before the noun; as *en häst*, a horse, *ett bord*, a table. The definite article is *den* in the masculine and feminine, *det* in the neuter, and *de* in the plural for all genders; as *den man*, the man; *det hus*, the house; *de män*, the men. The definite form of a noun is also expressed by only adding in the singular number *en* or *n* to masculine and feminine substantives, and *et* or *t* to the neuter; as *mannen*, the man, *bordet*, the table; and in the plural, *ne*, *na*, *a*, *en;* as *hästar*, horses, *hästarne*, the horses; or, thirdly, both these ways of expressing the definite form of the noun may be combined, as *den mannen*, *det bordet*, *de hästarne*. Substantives have a distinct case ending only in the genitive, which is formed by the addition of *s*. The plural of substantives is formed by adding *or*, *ar*, *er*, or *en;* and in some words the singular and plural are alike. The adjectives are formed after 2 declensions, the first of which has a separate form for the neuter gender, while the second has only one form for all the 3 genders. An awkward characteristic of the Swedish is the absence, in conversation, of any pronoun of address, the second person singular being used only among intimates or to inferiors, and the second person plural only in orations and sermons. In place of these the title of the person addressed, if he have one, with the third person, must be employed; otherwise the words *Herr* (sir, Mr.) to males, and *Fru* (madam) or *Mamsell* (miss) to females, must be used; thus: Have you seen the book? *Har Herrn* (Has the Mr.) *seet boken?* *Har Frun* (Has the madam) *seet boken?* There are, as in the other Scandinavian and Germanic languages, a strong and a weak form of conjugation. The verb has only 2 simple tenses, present and imperfect; all the others are formed by means of auxiliaries. The passive is formed by adding *s* to the active, and has the same 2 simple tenses with the active; as, *att skära*, to cut; *att skäras*, to be cut; *jag kallar*, I call; *jag kallas*, I am called; *jag kallade*, I called; *jag kallades*, I was called. Throughout the verbs the singular is the same in all the 3 persons; in the plural the 1st and 3d are alike, and the 2d ends in *en*. The similarity between the Swedish and English is shown by the following stanzas from one of the cantos of Tegnér's *Frithiofs Saga:*

Då steg Frithiof upp och lade
Then stood Frithiof up and laid
Hildings hand i sin och sade:
Hilding's hand in his and said:
"*Fader, jag har svarat redan,*
"Father, I have answered already,
Du har hört min själs beslut.
Thou hast heard my soul's resolve.

"*Rid, att Beles söner lära*
"Ride, that Bele's sons (may) learn
Hvad jag sagt; de kränkt min ära;
What I (have) said; they (have) stained my honor;
Inga band vid dem mig fästa;
Not a bond with them me fastens;
Aldrig blir jag deras man."
Never (will) be I their man."

"*Väl, din egen bana vandra,*
"Well, thy own career wander,
Ej kan jag din vrede klandra,
Not can I thy wrath condemn,
Odin styrer till det bästa,"
Odin steers for the best,"
Sade Hilding och försvann.
Said Hilding and vanished.

The dialects of the Swedish are as numerous as the provinces of the country. Those of Dalecarlia and Gottland present the greatest departure from the written language, while that of Södermanland approaches it the nearest. The dialects of Scania and Blekinge possess the greatest similarity to the Danish, the southern portion of Sweden having remained under the rule of Denmark to a late period. In the northern provinces the approximation to the old Icelandic forms and vocabulary is much more marked than in the southern, where the peasantry have been exposed to Danish and German influences. The Swedish is the language of the educated classes, and in general of the press, in the Russian grand duchy of Finland. Among the best grammars of the language are the Swedish works of Fryxell, Rydqvist, and Strömborg, the German of Dietrich, and the English of May; among the best dictionaries, those of Ihre (Upsal, 1769) and Dalin (2 vols., Stockholm, 1850–'54).—LITERATURE. The literature of Sweden, until very recent times, presents fewer points of general interest than that of almost any other European nation. This is chiefly owing to the isolation of the country, for only during two brief periods in her annals—the reigns of Gustavus Adolphus and Charles XII.—has Sweden occupied a political position which brought her into influential contact with foreign lands; and of these brilliant eras only the former exercised any influence upon her literature. Her literary history has been very conveniently divided by native writers upon the subject into six periods.—I. 1250 to 1520. The earliest writings extant in the Swedish language are the ancient provincial laws, of which the oldest compilation, that of the province of Westrogothia, was probably made about the middle of the 13th century. That they had existed for some time previous in an unwritten state seems to be indicated by the numerous alliterative or rhythmical phrases with which they are interspersed. The poetical spirit of the nation was first developed in the *Kämpavisor*, or heroic ballads, and a little later in the *Riddarvisor*, or chivalric ballads. Of these several collections have been edited; a few of them may perhaps be ascribed to the latter part of the 13th century, but the greater part of them belong to the 14th and 15th centuries. In style, and especially in the simple beauty of the melodies to which they were sung, they are excelled by the ballad literature of no other country. More artificial, but of greater influence upon the written language, were the rhymed romances of chivalry which found their way into the north from central and southern Europe, where they were so common during the middle ages. The oldest of these in Swedish were translated between 1300 and 1312 by order of Euphemia, queen of Norway, and were popularly called *Drottning Euphemias Visor*, "Queen Euphemia's Songs." They were *Hertig Frederik af Normandie*, *Ivan och Gavian*, *Konung Artus*, *Karl Magnus*, and *Flores och Blanseflor*. Other versions and paraphrases and a very few original romances followed them. Of little poetical but of considerable historical value are the two rhymed chronicles, *Den stora och den gamla Krönikarna*, "The Great and the Old Chronicles," narrating the leading events of Swedish history down to the reign of Christian the Cruel. Two bishops, N. Hermanni (died 1391) and Thomas (died 1448), are worthy of mention; the former, beside his translation of the life of St. Anscarius, wrote a "Legend of the Nun Elisif" in the ballad style; the latter composed some patriotic lyrics of a remarkable character. The abbey of Wadstena, founded by St. Brigitta (1302–'72) in 1363, was the centre of much activity in religious literature during the century thereafter. A manuscript still in existence makes it probable that the foundress herself wrote her "Revelations" originally in Swedish, whence they were subsequently rendered into Latin by her confessor. Her daughter, the abbess Catharine (died 1381), was the author of *Sjellinna Tröst*, "Soul's Trust," a paraphrase of a Latin ascetic treatise. The *Codex Vadstenensis*, a collection of legends from the German and Latin, several essays of a moral character, and some letters and diaries, were compiled or written by the monks and nuns of this foundation. An anonymous judicial treatise, *Domarereglorna*, "Rules for Judges," written with much clearness and precision, and a curious political work, *Om Konunga- och Höfdinga-styrelsen*, "On the Government of Kings and Rulers," based upon the book of an obscure Latin author, Ægidius Romanus, are the only remaining noteworthy monuments of Swedish prose before the reformation. The libraries of Sweden during the Catholic period were unimportant, and were contained in the monasteries. By far the largest was at Wisby, in the island of Gottland, which comprised 2,000 manuscripts. Printing was introduced into Stockholm in 1483, the first book printed being a collection of fables styled *Dialogus Creaturarum Moralisatus*. Presses were soon afterward established in Wadstena, Upsal, Westeras, Söderköping, and Malmö.—II. 1520 to 1600. The religious contests which followed the introduction of the reformed religion into Sweden continued during the whole of the 16th century, and gave a theological or rather polemical character to almost the entire literature. Two celebrated brothers, Olaus Petri (1497–1552) and Laurentius Petri (1499–1573), took a prominent part in the strife, and exerted an influence upon the literary development of their native tongue which can scarcely be overrated. Olaus was the author of the earliest translation of the New Testament (1526), of the earliest printed sermon (1528) and catechism (1530), and of the earliest dramatic composition in Swedish, *Tobiæ Comedia* (1550). He also wrote a *Svensk Krönika*, or chronicle of Swedish history, which was afterward rewritten by his brother Laurentius, the first Lutheran archbishop of the kingdom. The latter translated the Old Testament (1541), and compiled a code of ecclesiastical law; but the purity and strength of his style are seen to better effect in his sermons and in his psalm book, for which he composed 34 hymns, and which with some revisions was in use by the church for over a century. A liturgy known as *Rödboken*, the "Red Book," strongly Roman Catholic in its tendencies, was compiled by P. Fechten in 1576, and was a bone of contention for 25 years; it was defended by E. Nicolai (died 1580) and P. Paulinus, and bitterly attacked by M. Olai, N. Olai (died 1600), and other ultra Protestants. Beside the historical works of the brothers Petri, and some chronicles of the reign of Gustavus Vasa by R. Ludviksson (died 1594), P. Svart (died 1562), and S. Elofsson, there is little secular prose of value in the vernacular. The singular works of the last Catholic primate of Sweden, Johannes Magnus (1488–1544), *Gothorum Sveonumque Historia*, and of his brother Olaus (died 1568), *Historia de Gentibus Septentrionalibus*, were written and published at Rome in Latin. The poetry of the period is of little note. It consisted chiefly of hymns translated from the German, a few rhymed chronicles, and some popular ballads. J. Rondelitius wrote a dull religious drama, *Judas Redivivus*. Several hymns and a love song by King Eric XIV., and a *Visa*, or lay, by J. af Hoja (died 1585), exhibiting some power of imagination, are of greater poetic interest. The university of Upsal, nominally founded in 1476, was not permanently endowed until 1595, and did not begin to make its influence felt until the next century.—III. 1600 to 1718. The 30 years' war had a marked effect upon Swedish letters. Several libraries, captured in Germany, were sent to Sweden by Gustavus Adolphus; and the position which the military ability of that sovereign and the statesmanship of Oxenstiern gave to their country induced many learned foreigners to flock thither. Among them were Descartes, Salmasius, Vossius, Bochart, Huet, the younger Heinsius, Gronovius, Cassius, Pufendorf, Freinshemius, Loccenius, and Schefferus, most of whom were generously remunerated for their literary labors by the liberal patronage of Christina. Few of them, however, remained after her abdication. Their works were in Latin, as were those of many native writers. Of greater influence upon the vernacular literature were the researches into the antiquities of the North, and the study of the Icelandic literary monuments, which characterized the latter half of the 17th century and the earlier half of the 18th. Many Icelandic texts were published, including the Eddas, the writings of Snorro Sturleson, and a number of the historical and romantic sagas, accompanied with a prodigal display of erudition, which too often took the form of a puerile pedantry or wild speculation. The earliest, and in some respects the best of these zealous investigators was Olof Verelius (1618–'82), who edited several sagas, giving the Swedish and Latin versions on the same page with the original, a style of publication generally adopted by his successors. He was followed by the famous Olof Rudbeck (1630–1702), also celebrated as an anatomist and botanist, who, beside editions of Icelandic documents, wrote the *Atlantica*, a work full of misapplied learning, intended to prove that Sweden was the first home of the human race, and the Icelandic the original form of human speech. Its ingenuity and erudition aroused public attention upon its first appearance, but it is now chiefly famous as a bibliographical rarity, all but 4 of the copies of the 4th volume having been destroyed in a fire at Upsal. Johan Peringskjöld (1654–1720) published many of the ancient histories, including the bulky *Heimskringla* of Snorro Sturleson, and his Swedish translations were only inferior to those of Verelius in smoothness and perspicuity. Other scholars in this field were the brothers J. N. and P. Salanus, J. I. Reenhjelm (1644–'91), and the naturalized Icelanders J. Rugman and E. Olafsson. Johan Bureus (1568–1652), a man of comprehensive learning, J. Axehjelm, the laborious Johan Hadorph (1630–'92), and others published collections of runic inscriptions, and otherwise illustrated northern archæology and linguistics. The foreigners Pufendorf, Loccenius, Bœclerus, and Schefferus wrote on the history of Sweden in Latin. The voluminous work of J. Messenius (1579–1638), *Scondia Illustrata*, was given to the world by Peringskjöld 50 years after the author's death, and is of value as a thesaurus of materials. Eric Tegel (died 1638) wrote *Gustaf den Förstes Historia*, "History of Gustavus I.," as well as an account of the reign of Eric XIV.; histories of the times of the three first monarchs of the house of Vasa were also compiled by A. Girs (died 1639). The style of both is heavy. Equally as far from pleasing are the writings of J. Widekindi (1620–'97) on the Russian war of 1607–'17, and on the life of Gustavus Adolphus; but more commendable are those of J. Werwing (died 1697), who illustrated the reigns of Sigismund and Charles IX. Gustaf Adlerfeldt (1671–1709) narrated in French the military history of Charles XII. to 1709. The religious controversies of the previous period were continued through this, but assumed the shape of a contest between Lutheranism and Calvinism, or of doctrinal disputes. The principal theological writers were the bishops. Prominent among them were the archbishops L. Paulinus (died 1646), O. Svebilius (died 1700), E. Benzelius (1642–1709), and Haquin Spegel (1645–1714), and the bishops J. Terserus (1605–'78), J. Matthiæ, J. Rudbeckius (1581–1646), O. Laurelius, P. Winstrup (died 1679), E. Svenonius, and J. Baazius (1581–1649), all of whom distinguished themselves either in controversial theology, exegetics, or ecclesiastical history; but the greater part of them wrote in Latin. J. Gezelius (1615–'90), bishop of Abo, known as a Greek scholar, was still more famous for his commentary on the Bible. Jesper Swedberg (1663–1735), bishop of Skara, father of the celebrated Swedenborg, was a man of great activity and influence; he wrote a *Postilla* or collection of sermons, several hymns of considerable poetic beauty, an account of the Swedish congregations in America under the title of *America Illuminata*, and many minor treatises. The field of metaphysics was principally occupied with discussions between the disciples of the scholastic philosophy and the Ramists, though a few of the Swedish learned professed themselves Neo-Platonists. There was little originality. Descartes had some followers, who greatly promoted the freedom of scientific investigation. In jurisprudence, beside Pufendorf and the prolific Loccenius, the names of M. Vexionius, author of *Politica*, a bold treatise on the rights of sovereigns, and of J. Stjernhök (1596–1675), who wrote a valuable treatise *De Jure Sveonum et Gothorum*, are well known. Some works of geographical interest appeared, such as the costly volumes of Count E. Dahlberg (1625–1703), *Svecia Antiqua et Hodierna*, comprising 353 maps and engravings of Swedish towns and castles, works on Lapland by Schefferus and J. Tornæus, the *Nya Sverige* or "New Sweden" of J. Campanius, the travels of C. Ralamb to Constantinople (1658), and those of N. Kjöping and Willmans to the East Indies (1666). Classical philology was much cultivated both by resident foreigners and natives, including among others Schefferus, Loccenius, Freinshemius, Gezelius, P. Lagerlöf, and J. Columbus. J. Bureus published the first Swedish grammar (1636), and Archbishop Spegel's *Glossarium Sveo-Gothicum* (1712) was the earliest Swedish lexicon. In other sciences, O. Rudbeck as a botanist paved the way for the great name which was to adorn the next period; U. Hjärne (1641–1724) and E. Odelstjerna treated of mineralogy; and J. Bilberg, M. Celsius, and A. Spole gained celebrity as astronomers and mathematicians. The only noteworthy works on literary history are the *Svecia Litterata* of Schefferus and the *Holmia Litterata* (1701) of R. von der Haardt. In poetry Georg Stjernhjelm (1598–1672) held the foremost place, and did much toward introducing a better taste. His most complete poetical work is *Hercules*, a sort of didactic epic in hexameters, exhibiting large imaginative power and much poetic skill. Of his masques the best is *Den fångne Cupido*, "The Captive Cupid." Stjernhjelm was the first writer of sonnets in Swedish. The drama consisted generally of dull imitations of Olaus Petri and Rondelitius, the chief writers being the historian Messenius, who attempted to exhibit the whole of Swedish history in a series of dramas, S. P. Brask (1613–'68), and A. J. Prytz (1590–1655). More classically dramatic in form, but scarcely better in style, are the *Rebecca* of J. Beronius and the *Rosimunda* of U. Hjärne, while but little more praise can be bestowed upon the dramatic allegories of J. P. Chronander. The lyric writers may be divided into two schools, the Italian and the German. To the former belonged G. Dahlstjerna (1658–

1709), author of the *Kungaskald*, a half heroic, half elegiac poem in *ottave rime* on Charles XI., and of an unsuccessful translation of Guarini's *Pastor Fido;* and G. Rosenhane (1619–'84), whose longest metrical attempt, *Venerid*, is a collection of 100 sonnets. The chief representatives of the German school were S. Columbus (1642–'79), whose lyrics and pastorals are now nearly forgotten; L. Johansson (died 1674), whose *Helicons Blomster*, "Flowers from Helicon," published under the pseudonyme of Lucidor, is a collection of epithalamiums, elegies, and erotic songs, which are less remarkable than his hymns, and P. Lagerlöf (1648–'99), author of a *Visa* or love song of great popularity in its day. The many-sided Spegel, some of whose hymns are worthy of mention, wrote two heavy and monotonous poems, borrowing his titles from the two epics of Milton. C. Arosell is known as the author of a volume of *Ofverskrifter*, or epigrams, a few of which are of merit.—IV. 1718 to 1772. These years embrace a time of great political and of considerable literary activity. The natural sciences, under the influence of the world-famous Linné or Linnæus (see Linné), occupy the first place. That great naturalist was surrounded by a crowd of pupils, a large number of whom became celebrated. Many of them undertook distant journeys, in order to extend their acquaintance with the productions of nature, and acquired reputation both as travellers and botanists. J. P. Falck (died 1773) explored Russia; P. Forskal (1736–'63) undertook a scientific journey to Egypt and Arabia, where he died, leaving the results of his researches to be published by his companion Niebuhr; F. Hasselquist (1722–'52) visited Asia Minor; P. Löfling (died 1756) went to Spain and thence to South America; P. Osbeck (died 1805) traversed the East Indies and China; D. Solander (1736–'81) accompanied Capt. Cook around the world (1768–'71); P. Kalm (1715–'79) journeyed through North America, and E. Laxman through Siberia. Others of equal zeal and industry, such as C. Bjerkander and J. G. Wahlbom, illustrated the flora of northern Europe. Linnæus, who devoted much labor to zoological classification, was excelled in this department by his friend P. Artedi (1705–'35), whose treatise on ichthyology he edited in 1738. To physiology belong the *Œconomia Regni Animalis* and *Regnum Animale* of Swedenborg. The entomological works of C. F. de Geer (1720–'78), published in French, are still esteemed. Eminent in chemistry were Torbern Olof Bergman (1735–'84), who correctly explained the composition of many salts previously misunderstood, and laid the foundation for the science of crystallography; A. F. Cronstedt (1722–'65), the discoverer of nickel; and J. G. Wallerius (1709–'85). Much attention was paid to mining by M. von Bromell (1679–1731), Swedenborg, and others. Olof Rudbeck the younger (1670–1740) distinguished himself in several sciences, one of his works being an ornithology in 3 volumes. N. Rosén von Rosenstein (1709–'73) was the reformer of medical science in Sweden. Astronomy was illustrated by such names as A. Celsius (1701–'44), S. Klingenstjerna (1689–1785), and P. W. Wargentin (1717–'83), all of European celebrity; mechanics by C. Polhem (1661–1751) and Swedenborg; and other branches of mathematics by J. Faggot, C. Falkengren, E. O. Runeberg, and others. Jurisprudence was represented by D. Nehrman (died 1769) and O. Rabenius (1730–'72). In theology, orthodoxy found new foes to combat in the pietists, the believers in Swedenborg, and the followers of Zinzendorf; but the bishops were in general men of less ability than in the preceding century. S. Alnander, J. Benzelius, P. Munch, L. P. Halenius (compiler of an excellent concordance to the Bible), P. Muhrbeck (who together with A. C. Rutström and E. Tollstadius underwent much persecution from the state church on charges of heterodoxy), and J. Serenius were the chief writers in the various departments of theology; but the science produced no very eminent man except Swedenborg. (See Swedenborg.) The best known metaphysician and thinker was the Cartesian A. Rydelius (1671–1738), author of *Förnuftsöfningar* ("Exercises in Reason"), and other philosophical essays; the system of Wolf was supported by P. Högström, N. Wallerius, and C. Mesterton; that of Locke by A. Schönberg (1737–1811) in his *Inledning tils den naturliga Lagen och Sedoläran* ("Introduction to the Laws of Nature and Morals"), by F. Kryger (1707–'77) in his *Naturlig Theologi*, and by E. O. Runeberg. A laborer of importance in the province of philology was Johan Ihre (1707–'80), whose *Glossarium Sveo-Gothicum* was a great improvement on the dictionary of his predecessor Spegel, and whose Swedish dialect lexicon and researches concerning Ulfilas and the Mœso-Gothic give evidence of great learning and diligence. The Icelandic scholars of the preceding generation were followed in the earlier portion of this period by J. F. Peringskjöld (1688–1725), E. J. Björner, Count G. Bonde (1682–1764), J. Göransson (editor of the elder Edda and compiler of *Bautil*, a collection of 1,000 runic inscriptions), and N. R. Brocman, all of whom gave to the world editions of old northern writings, but whose commentaries were lessened in value by the same hyperbolical extravagance which characterized those of their predecessors. Before the middle of the 17th century the taste for Icelandic studies greatly declined. The description of Sweden by E. Tuneld is the only special geographical work of note, and in addition to the travels already enumerated only those of J. J. Björnstahl (1731–'79) through Europe deserve mention; they abound in classical learning and literary information, and have been translated into several languages. In history, as in polite literature, Olof Dalin (1703–'63) stands at the head of this period. His journal *Den Svenska Argus*, "The Swedish Argus"

(1732–'4), an imitation of the English "Spectator," exerted a weighty influence upon the prose style of the language and the literary taste of the nation. His *Svea Rikes Historia*, "History of the Swedish Realm," ends with the reign of Charles IX., and, though wanting in critical ability, is eloquent and pleasing. A more rigorous examination of evidence characterizes the Swedish histories of A. af Botin (1724–'90) and P. Schönström. The history of Charles XII. by G. Norberg (1677–1744) is valuable as an account by an eye-witness of most of that monarch's military adventures; and the "Memoirs of Christina" by J. Arckenholtz, written in French, has been of great assistance to succeeding writers. O. Celsius the younger (1716–'94) wrote histories of the reigns of Gustavus Vasa and Eric XIV., and rendered a great service to Swedish letters by establishing the *Tidningar om de Lärdes Arbeten*, "Journal of the Works of the Learned," the first critical periodical in the language. In this work he was followed by C. C. Gjörwell (1731–1811), a very prolific writer, who conducted with marked ability *Den Svenska Mercurius* and other literary and historical serials. Of the 7 volumes of the *Bibliotheca Sveo-Gothica* of A. A. von Stjernman, only the first has been published; but the voluminous and wonderfully accurate *Bibliotheca Historica Sveo-Gothica* of C. G. Warmholtz (1710–'84) dates from this period, although not given to the public until 1782–'92. Stjernman, E. Benzelius (1675–1745; a man of various and extended erudition), B. Bergius (1723–'84), G. Wallin (1686–1760), and S. Loenbom (died 1776) were laborious critics, editors, and collectors, and brought to light or illustrated a great number of early Swedish monuments. Dalin's poetical works comprise a dry allegorical epic, *Den Svenska Friheten* ("Swedish Freedom"), a cold and languid tragedy, *Brynhilda*, a lively comedy, *Den afundsjuke är qvick* ("The Jealous Man is Sharp-witted"), an ingenious and forcible satire, *Aprilverk*, and many minor pieces which are generally pleasing without much depth or vigor. H. C. Nordenflycht (1718–'63), a woman of singular ability, left a high name as a writer of lyrics, and was the centre of a literary circle which after her death became widely known as the society *Utile Dulci*. Among her lettered friends were two noblemen, Count G. P. Creutz (1729–'85), author of a tolerably felicitous pastoral, *Atis och Camilla*, and Count G. F. Gyllenborg (1731–1808), who composed lyrics, elegies, satires, and fables, in a smooth and correct, but too often prosaic style. Lyricists of less note were A. Odel (died 1773), U. Rudenschöld (1698–1783), O. Bergklint (1733–1805), and O. Kolmodin (1690–1753). The writers of France served as models to numerous Swedish authors during this period from Dalin downward, and all the tragedies of the time, by E. Wrangel, H. Hesselius, O. Celsius the younger, and others, were lifeless imitations of Gallic prototypes. Such was the case too with the tedious romances of J. H. Mörk (1714–'63), the first Swedish novelist. Molière, Voltaire, Boileau, La Fontaine, Marmontel, and Fénélon were translated and sedulously imitated. Two important learned associations were founded in the first half of the 18th century, the Upsal society of science (1728) and the royal academy of science at Stockholm (1739); the transactions of both are of great scientific value. *Vitterhets Akademien*, the "Academy of Belles-Lettres," established by Queen Louisa Ulrica in 1753, was suspended in 1756, but was revived in 1782 as the academy of belles-lettres, history, and antiquities, and publishes chiefly historical and archæological matter.—V. 1772 to 1809. The earlier portion of this period took its impress to a great extent from the character of the sovereign, Gustavus III. His influence was not beneficial to the higher walks of literature, but he founded the "Swedish Academy of Eighteen" (1786), and otherwise sought to encourage letters. The pupils of Linnæus continued to be the chief scientific men of the time, and labored earnestly for the advancement of science. C. P. Thunberg (died 1798), author of the *Flora Japonica*, travelled in the extreme East; A. Afzelius visited Sierra Leone; and A. Sparrman went to South Africa, and subsequently accompanied Forster and Cook to the South sea (1772–'6). Of other naturalists, E. Acharius (1757–1819) acquired a universal celebrity for his studies in lichenography, O. Swartz (1760–1817) illustrated the flora of the West Indies, A. J. Retzius (1747–1821) was a fertile writer on botany and zoology, and C. Qvensel began in 1802 the publication of an important work, *Svensk Botanik*, a general treatise on the Swedish flora. As chemists and mineralogists, the period furnished C. V. Scheele (1742–'86), regarded as one of the founders of organic chemistry, J. G. Gahn (died 1818), to whom several chemical inventions are due, J. J. Ankarström, and S. Rinman. D. Manderhjelm (died 1810), F. Mallet (died 1791), and H. Nicander were widely known for their astronomical labors. Juridical writers were M. Calonius (died 1817), L. Tengvall, and others. Medical science was cultivated by O. af Acrel (died 1807), who enjoyed a deserved celebrity as a surgical author, and D. Schulz von Schulzenheim (1732–1823). There was little literary activity in the theology of the age, but the labors of A. Knös in dogmatics and of S. Ödman (1750–1829) in exegetics were of high reputation in their day. More æsthetical than metaphysical was Thomas Thorild (1759–1808); his last and most philosophical work, *Archimetria*, is in Latin. Another name of note in æsthetics is C. A. Ehrensvärd (1745–1800), author of an excellent and acute treatise on the fine arts, *De fria Konsternas Filosofi*. Somewhat later than these was the philosopher B. C. H. Höijer (1767–1812), who has explained in a clear, distinct, and graphic style his own system, which is based upon those of Fichte and Schelling. A geographer of great industry was

D. Djurberg, but he possessed little scientific ability. The travels of C. B. Wadström (1746–'99) to the W. coast of Africa, of U. von Troil to Iceland, and of O. Agrell to Morocco, have been translated into various languages. Sven Lagerbring (1707–'87) is to be regarded rather as a collector of historical materials than as a historian, although his *Svea Rikes Historia*, too often inaccurate, was looked upon as a national work by his contemporaries, and its author was richly rewarded by the Swedish estates. His other writings are numerous. E. M. Fant (1754–1817) compiled a *Diplomatarium* and an extremely valuable collection of *Scriptores Rerum Svecicarum*. Comprehensiveness and exactness were the distinguishing traits of Jonas Hallenberg (1748–1834), author of a universal history from the beginning of the 16th century, and of many other works, historical, archæological, or philological. H. G. Porthan (1739–1804) investigated the history and antiquities of Finland. Special periods or departments of Swedish history were illustrated by C. G. Nordin (1749–1812), O. Knös (died 1804), J. A. Rehbinder, S. L. Gahm, and U. von Troil (1746–1803). G. Gezelius (1732–'89) compiled the first noteworthy biographical lexicon of distinguished Swedes. Under the direct influence of the monarch, the French taste, which had so largely developed itself in the preceding period, now became almost entirely prevalent. Gustavus himself wrote some dramatic pieces of much merit, but all frigidly French. He was a speaker of considerable force and grace, and oratory became a much studied art. The rhetorical and verbose eloquence of the day was best represented by N. von Rosenstein (1752–1824) in the rostrum, and M. Lehnberg (1758–1808) in the pulpit. The favorite poets at the court of Gustavus III. were Kellgren, Leopold, and Oxenstiern. J. H. Kellgren (1751–'95) was famous in his time in almost every branch of the poetic art, and exercised much influence upon public taste as editor of *Stockholms Posten*, "The Stockholm Post;" his best productions are a satire, *Ljusets Fiender*, "The Foes of Light," and his lyrical dramas and minor pieces. C. G. af Leopold (1756–1829), who has been styled not very appropriately "the Voltaire of Sweden," wrote some didactic poems in the style of Pope, many serious lyrical pieces, some humorous poems which are still pleasing, and two tragedies, *Odin* and *Virginia*. Count J. G. Oxenstiern (1750–1818) was the translator of Milton, and author among other things of two agreeable descriptive poems, *Dagens Stunder*, "The Hours of the Day," and *Skördarne*, "The Harvest." The lyrics of M. Choræus (1774–1806), the *Spastara* and *Medea* of B. Lidner (1759–'93), the poet of the passions, and the translations from Virgil, Horace, and Ovid by C. E. Adlerbeth (1751–1818), are yet read with pleasure. A few poets escaped the general contagion. Foremost among these was Karl Michael Bellman (1740–'95), a song writer of the highest powers and most glowing fancy. His songs are all set to appropriate melodies by himself, the two chief collections being known as *Fredmans Epistlar* and *Fredmans Sånger*, the epistles and songs of Fredman. Two of his friends, C. I. Hallman (1732–1800) and O. Kexél (1748–'96), were comic dramatic writers of worth, the best production of the former being an afterpiece, *Tillfället gör Tjufven*, "Opportunity makes the Thief," and of the latter a comedy, *Kaptén Puff*. The verse of a female writer, A. M. Lenngren (1754–1817), much of it humorous, possesses a grace and smoothness unusual among her contemporaries. A curious book of travels entitled *Min Son på Galejan*, "My Son in the Galley," by J. Wallenberg (1746–'78),is partly in verse, and abounds in a coarse but lively wit. The last years of this period, comprising the reign of Gustavus IV., exhibited little literary life. Freedom of the press, which had been established in 1774, and had been somewhat restricted in 1780, was altogether abolished in 1798, and a sytematic censorship enforced. The Swedish academy was suspended for some months in 1795, Thorild was banished, Leopold was ordered away from the capital, and Höijer was not allowed to write.—VI. 1809 to 1861. With the political revolution of 1809, the literature of Sweden was endowed with a new spirit; poetry abandoned its tawdry Gallicism, and prose was greatly developed by a general substitution of the vernacular for the Latin in the works of the learned. Schools have largely improved both in number and character, and libraries have increased. The scientific world has again been taught to look to the North for one of its great lights, and has recognized in Johan Jakob Berzelius (1779–1848) a luminary scarcely less lustrous than Linnæus. His great services in every department of chemistry have been universally acknowledged. His principal works are *Föreläsningen i Djurkemien* ("Lectures on Animal Chemistry"), *Lärobok i Kemi* ("Text Book of Chemistry"), the latest and best editions of which are in German, and a long series of annual reports on chemistry and physics published by the Swedish academy of sciences. His chief pupil was N. G. Sefström (died 1845), esteemed both as a chemist and geologist; but better known as geologists are Hisinger, author of the *Lethæa Svecica* (1837–'40), and Angelin, author of a still later treatise, *Palæontologia Svecica*. As botanists the reputation of three men has extended beyond their native land: Elias Fries (born 1794), whose *Systema Mycologicum* (1821) made an epoch in the study of the fungi; K. A. Agardh (born 1785), author of the *Systema Algarum* and of important treatises on the physiology of plants; and G. Wahlenberg (1780–1851), who continued the *Svensk Botanik* of Qvensel, and contributed to a knowledge of the Scandinavian flora. Other eminent names in this science are P. F. Wahlberg; C. J. Hartman (died 1854), author of a *Svensk Flora;* J. E. Wikström (died 1856), compiler of a botanical bibliography; J. G.

Agardh, who has continued his father's researches into the algæ; and J. E. Areschoug. Zoology has a famous cultivator in Sven Nilsson, author of *Skandinaviens Fauna*, and of a remarkable treatise, *Skandinaviska Nordens Urinnevånare* ("The Scandinavian North's Primeval Inhabitants"), an ethnographical work which has materially changed the opinions of the learned concerning the primitive history of northern Europe. Entomology has been ably treated by J. W. Dalman (died 1828); C. J. Schönherr, in his *Genera et Species Curculonidum* (1833–'45), containing the results of 80 years' labor; and S. W. Zetterstedt, in his extensive *Diptera Scandinaviæ*. The chief laborer in ornithology, beside Nilsson, has been C. J. Sundevall. Among mathematicians J. Svanberg, and among physicists Z. Nordmark (died 1828), F. Rudberg, and F. W. von Ehrenheim (died 1828), have gained considerable eminence. Medical science furnishes the names of A. A. Retzius (died 1860), whose discoveries in anatomy conferred upon him a European fame, and J. Hvasser, a writer on the theory of medicine. The ancient provincial codes have found an able editor in C. J. Schlyter, while committees of eminent lawyers have elaborated new codes for the whole kingdom. Prominent legal scholars have been L. G. Rabenius, E. Bergfalk (also known as a political economist), J. J. Nordström, F. Schrevelius, C. Nauman, J. C. Lindblad, and J. G. Carlén. In the domain of politics a large literature has sprung up during the present century. A few names are J. A. Hartmansdorff, M. F. F. Björnstjerna (born 1799), E. S. Bring, P. G. Cedersctjöld (died 1860); J. P. Theorell (born 1791), who edited from 1828 to 1832 the *Dagligt Allehanda*, an influential journal; his brother S. L. Theorell (born 1784), of still greater ability and fertility; A. Lindeberg, editor from 1821 to 1833 of *Stockholms Posten;* M. J. Crusenstolpe (born 1795), author of *Ställningar och Förhållanden* ("Situations and Relations") and other politico-historical works, in an excellent style, but characterized by a bitter controversial spirit; L. J. Hjerta (born 1801), from 1830 to 1851 conductor of the *Aftonblad*, a liberal daily journal which still stands at the head of Swedish journalism; and P. E. Svedbom (died 1856), a forcible writer, who succeeded Hjerta as editor of the *Aftonblad*. The metaphysicians have chiefly copied Fichte, Schelling, or Hegel, and have produced little that is new. The Fichte-Schelling school is represented by the historian Geijer, the poet Atterbom, S. Grubbe (born 1786), and N. F. Biberg (1776–1827); while Hegel's theories have found defenders in E. S. Bring and J. W. Snellman. Later metaphysicians are C. J. Boström and S. Ribbing. Purely æsthetical are Atterbom and Hammarsköld, in numerous treatises and articles, and A. Törneros (1794–1838), who wrote in a style resembling that of Richter. Swedish geography and statistics are much indebted to W. Tham and C. af Forsell, the former having for some years been engaged upon a minute description of Sweden, and the latter having published *Statistik öfver Sverige*, "Statistics of Sweden." F. W. Palmblad wrote (1823) a noteworthy work on Palestine and an incomplete geographical handbook on a large scale, while G. Thomée and Rietz have both given to the public works of merit on this science. Travellers have been rather numerous than important. P. Læstadius has described Lapland (1828–'33); J. Berggren has visited the Holy Land (1826–'8); Turkey and Persia were explored by G. von Heidenstam (1828), Egypt by Hedenborg (1841), the East Indies and China by G. von Düben (1844–'7), and North America by A. Klinkowström (1818–'20), C. D. Arfwedsson (1832–'6), F. Bremer (1854), and C. A. Gosselman (1828–'39). An account of a circumnavigation of the globe was published by N. J. Andersson (1851–'3). The grammar of the Swedish language has been best treated by J. E. Rydqvist (born 1800), while the Swedish dictionary of A. F. Dalin, finished in 1855, has supplied a long felt want. The mother tongue (the Icelandic) and its literature, after remaining unstudied for more than half a century, have again received much attention. A. A. Afzelius (born 1785) translated the elder Edda and other texts, while versions have been published by Kröningsvärd, A. J. D. Cnattingius (born 1792), Carl Säve, a profound philologist, and others. A. O. Lindfors issued (1829) an *Inledning till Isländska Litteraturen*, "Introduction to Icelandic Literature." The Mœso-Gothic is largely indebted to A. Uppström, who has published a critical edition of Ulfilas. In other philological departments only M. Norberg (died 1826), C. M. Agrell (died 1840), and O. F. Tullberg in Syriac, and J. Berggren (born 1790), compiler of a French-Arabic lexicon, are known abroad. Since the change of government the established church, opposed as it always has been to progress, has had many foes to contend against, including the rationalists, the followers of Strauss, the Baptists, the Separatists, and especially the so called *Läsare* or Readers, a sect not unlike the Methodists in doctrine and practice. The chief names in doctrinal theology are H. Reuterdahl, now archbishop, a disciple of Schleiermacher, M. E. Ahlman, G. Knös (died 1837), L. G. Anjou, F. G. Hedberg, a Finnish priest, A. Wiberg, the defender of baptism, and N. Ignell. In exegetics the prominent writers are B. J. Bergqvist, author of *Förnuft och Uppenbarelse* ("Reason and Revelation"), J. H. Thomander (born 1798), editor with Reuterdahl of the *Theologisk Qvartalskrift*, and Bishop Agardh; in pastoral theology the most noted are A. G. Knös and A. Z. Pettersson. As preachers, H. Schartau, Archbishop Wallin, C. G. Rogberg, C. P. Hagberg, and others have gained a high reputation for eloquence, and have all published collections of sermons. Archbishop Reuterdahl is the author of a fine piece of historical criticism, *Svenska Kyrkans Historia* ("History of the Swedish Church"), which only reaches to 1889; L. G. Anjou has published an excellent *Svenska Reformationens Historia* ("History of the Swedish Reformation"), which has been translated into English; and J. J. Thomæus (died 1845) has written the only complete history of the Swedish church. The teachings of Swedenborg have been zealously followed by J. Tybeck, C. U. Beurling, and A. Kahl. Swedish history has never before been so devotedly studied. Excelling all in grace and dignity of style and in philosophical treatment, if not in the critical examination of materials, the first place is due to Eric Gustaf Geijer, (1783–1847), whose *Svea Rikes Häfder* ("Annals of the Swedish Realm") and *Svenska Folkets Historia*, the former a fragment and the latter ending with the abdication of Christina, are models of historic composition. Less successful has been the *Svenska Folkets Historia* of A. M. Strinnholm (born 1787), reaching down to 1819. More complete is the work of Anders Fryxell (born 1795), who, under the modest title of *Berättelser ur Svenska Historien* ("Narratives from Swedish History"), has published a national history, in a perspicuous and not inelegant style, which extends through the reign of Charles XII. and is still continued. Special historical writers are P. A. Granberg, in his *Kalmare Unionens Historia* ("History of the Calmar Union"), *Folkungättens Historia*, and other works; G. A. Silfverstolpe (1772–1824), in his *Svenska Statsförfattningens Historia* ("History of the Swedish Constitution"); J. F. af Lundblad (born 1791), in his histories of the times of Charles X. and Charles XII.; A. Cronholm in his *Väringarna* ("The Varangians") and *Vikingatågen* ("Expeditions of the Vikings"); A. A. Afzelius in his *Svenska Folkets Sagohäfder*, an agreeable and interesting work on the popular superstitions, religious belief, traditions, and customs of the Swedish peasants; H. Järta, A. I. Arwidsson, and many others. Historical collections are the *Handlingar rörande Skandinaviens Historia* ("Transactions relating to the History of Scandinavia"), published in annual volumes since 1816; the *De la Gardiska Archivet*, or "Archives of the De la Gardie Family," edited by Wieselgren; and the collections issued by the brothers C. and G. Adlersparre, A. Wallmark, Kröningsvärd, G. Bonde, C. F. Rothlieb, C. G. Malmström, and several others. The foremost archæologists of the period are N. Sjöborg, author of *Samlingar för Nordens Fornälskare* ("Collections for Lovers of the Old North"); J. G. Liljegren (died 1837), who began a *Diplomatarium Svecanum*, and wrote two standard works on runes, *Runlära* and *Runurkunder*; A. E. Holmberg, known by his excellent *Skandinaviens Hällristningar* ("The Pictured Rocks of Scandinavia"), and his popular *Nordbon i Hedendomen* ("The Northmen in Heathen Times," 1853); B. E. Hildebrand, a learned numismatist; C. G. Brunius, and R. Dybeck. C. E. Hylten-Cavallius, H. Klemming, J. A. Ahlstrand, and others founded the *Fornskrift-Sällskap*, which has edited a large number of Swedish mediæval writings. *Svenska Vitterhetens Historia* ("History of Polite Letters in Sweden"), by L. Hammarsköld (1785–1827), an author of much research, but of erroneous views in criticism, was the first important work of its kind. It has been followed by the more extended treatise of P. Wieselgren (born 1800), *Sveriges sköna Litteratur*, which has some faults, but is on the whole of great value; by the excellent *Svenska Siare och Skalder* ("Swedish Seers and Bards") of Atterbom; by the *Framfarna Dagars vitira Idrotter* ("Learned Labors of Past Times") of J. E. Rydqvist; and the able manuals on Swedish literary history of C. J. Lénström. The *Biographiskt Lexikon*, a biographical dictionary of celebrated Swedes, edited by Palmblad and subsequently by Wieselgren, is a colossal work of great worth and research in 25 volumes. This is the brightest age in the annals of Swedish poetry. In some of the earlier verse writers of the period traces of the Gustavian school are visible; but these soon gave way to a better spirit. F. M. Franzén (1772–1847) has gained a lasting renown by his naïve and idyllic lyrics, and by his beautiful elegy on Crentz; less read are his *Gustaf Adolf i Tyskland* ("Gustavus Adolphus in Germany"), his fragmentary epic *Columbus*, and his didactic and dramatic pieces. J. O. Wallin (1779–1839), celebrated as an eloquent preacher and orator, began his poetic career with some heavy prize poems in Alexandrines and some dry didactic essays; but his style subsequently changed, and some of his shorter pieces are of great beauty. He revised in 1819 the Swedish psalm book, a collection of religious verse hardly excelled in modern hymnology, which had been previously edited by Spegel (1695), and others. Wallin added 117 psalms by himself and 78 by Franzén, inferior to none in the book. J. D. Valerius, best known by his bacchanalian songs, and J. M. Silfverstolpe (1777–1831), rather a translator than an original poet, both belonged to the earlier part of the century. Two new poetic schools, of vast influence upon polite literature, arose at the beginning of this period, the romantic and the Gothic. The former was represented by the journals *Polyfem* (1810–'12), edited by J. C. Askelöf (born 1787), and *Fosforos*, whence its members are sometimes styled *Fosforister* or phosphorists. At the head of this school stood P. D. A. Atterbom (1790–1855) as a poet, and Palmblad and Hammarsköld as critics. Atterbom's long poem, *Lycksalighetens Ö* ("The Island of Bliss"), his *Blommorna* ("The Flowers"), and many of his shorter lyrics, are characterized by depth of fancy and feeling. Other *Fosforister* were C. F. Dahlgren (1791–1844), author of *Mollbergs Epistlar*, an imitation of the songs of Bellman; C. E. Fahlcrantz (born 1790), a successful humorist in his *Noaks Ark*, but less happy in his religious epic, *Ansgarius*; and J. C. Nyberg (born 1785), a female writer of considerable ease and grace, better known as Euphrosyne. The Gothic school, which has left a more permanent impress upon poetry, developed its theories through a society, the *Göthiska Förbundet* (the "Gothic Union," 1811), and a journal, *Iduna* (1811–'24). It sought its sources of inspiration in the ancient literature and mythology of the North. Foremost among its members, and foremost among all the poets of Sweden, stands Esaias Tegnér (1782–1846). His *Frithiofs Saga*, based upon one of the old semihistorical stories of the Icelandic, is the longest of his works. The popularity of this singularly beautiful poem at home is unequalled, and abroad it has been rendered into many languages, including no fewer than a dozen different versions in German alone. *Axel* is a shorter poem, narrating an incident of the wars of Charles XII., and ranks only second to *Frithiofs Saga*. The *Nattvardsbarn* ("Children of the Lord's Supper"), translated into English by Longfellow, is one of the most successful specimens of hexametric verse in any modern tongue. Of Tegnér's shorter pieces, *Hjelten* ("The Hero"), *Polarresan* ("The Polar Journey"), and *Sång till Solen* ("Ode to the Sun") are reckoned among the best. The historian Geijer was another member of the *Göthiska Förbundet;* his lyrics are original, strong, and clear. There is more novelty and force than good poetic taste in the *Asarne* ("The Gods of the North"), *Tirfing*, and the historical tragedies of P. H. Ling (1766–1839), who is better known out of Sweden as the founder of a new system of medicine or medical gymnastics. Far better in style was C. A. Nicander (1799–1839), author of *Runesvärdet* ("The Runic Sword") and other poems. Influenced by one or other of these two schools, but to a certain extent independent of both, are E. J. Stagnelius (1793–1823), whose dramas, such as *Martyrerna* ("The Martyrs"), epical poems, as *Wladimir*, and minor pieces, are marked by an admirable spirit and great beauty of diction; Erik Sjöberg (1794–1823), better known by his assumed name Vitalis, who, like Nicander and Stagnelius, died just as his powers were ripening into a promising maturity; A. Lindeblad (born 1800), a composer of religious and secular lyrics in the spirit of Tegnér; and A. A. Grafström (born 1790), whose poetical development was strongly influenced by Franzén. The highest rank among living poets is held by Johan Ludvig Runeberg, a native and resident of Finland, in whose *Fänrik Ståls Sägner* ("Ensign Stal's Stories"), a series of patriotic lyrics on the Swedish-Russian war of 1808–'9, are displayed an energy of expression and a depth of poetic thought unknown to Swedish literature since the death of Tegnér. C. W. Böttiger (born 1807), the son-in-law of Tegnér, has written some musical dramas and minor pieces, distinguished by a lively fancy and a cultivated taste. O. P. Sturzenbecker is the author of lyrics after the manner of Heine, and of humorous sketches. Somewhat later are Von Braun (died 1860), whose humor is striking, but too often broad and coarse; Nybom; C. W. A. Strandberg, whose pseudonymous name is Talis Qualis, and who has translated Byron and written some lyrics of great excellence; Malmström, Sätherberg, J. M. Lindblad; Tekla Knös, a poetess, whose claims to fame have been sanctioned by the Swedish academy; G. Silfverstolpe, Wennström, and many others. A series of humorous songs, descriptive of university life, under the title of *Gluntarne*, the words and music by G. Wennerberg, have attained a marked popularity. Tragedies and historical dramas have been written by J. Börjeson (born 1790), one of the *Fosforister*, whose *Eric XIV.* is one of the masterpieces of the Swedish drama; C. E. Hylten-Cavallius, Dahlgren, and Kullberg; and comedies by A. Blanche, Jolin, Cramér, Hedberg, Granlund, Beskow, and others. No romances stand higher than those of three female writers, Fredrika Bremer (born 1802), whose first work (1828) was styled *Teckningar ur Hvardagslifvet* ("Sketches of Every Day Life"); E. S. Carlén (born 1810), a prolific and popular authoress of novels of society; and Baroness Knorring (died 1833). All of these are widely known both in Europe and America through numerous translations. Of the imitators of Sir Walter Scott, the highest name is perhaps the learned and versatile V. F. Palmblad (1788–1852), celebrated as a geographer, critic, biographer, and politician of the ultra conservative school, whose *Aurora Königsmark* was one of the earliest readable fictions in Swedish. Equally versatile was C. J. L. Almquist (born 1793), whose tales, and especially a collection called *Törnrosens Bok*, are rich in variety and fancy. Other romancers are Count P. G. Sparre (born 1790); F. Cederborg (born 1784), author of *Ottar Tralling* and *Uno von Trasenberg*, historical fictions of much interest; C. F. Ridderstad (born 1807), an imitator of the Dumas school; Kjellman-Göransson, Zeipel, Bjursten; Wetterberg, a popular writer of sketches and tales under the assumed name of *Onkel Adam;* and G. H. Mellin (born 1803). As translators may be mentioned C. A. Hagberg, author of an accurate and spirited version of the complete works of Shakespeare; Andersson, translator of Goethe; and N. Lovén, who has rendered the poems of Dante and Camoens into Swedish verse. Most of the higher efforts of literature in English, French, German, Italian, and Danish, especially in fiction, have been translated within the last 30 years.

SWEDENBORG, Emanuel, a Swedish philosopher and religious writer, born in Stockholm, Jan. 29, 1688, died in London, March 29, 1772. He was the son of Jesper Swedberg, bishop of Skara in West Gottland, who had the charge of the Swedish church in England and its American colonies. The family was ennobled in 1719 by Queen Ulrica Eleonora; and thenceforth he assumed the name of Swedenborg, and took his seat with the nobles of the equestrian order in the triennial assembly of the states. He was in his childhood the subject of deep religious impressions. He received the best education which the times and the country afforded, taking the degree of doctor of philosophy at the university of Upsal in 1709, and afterward travelled in foreign countries. In some of his early productions he displayed much poetical talent, but he was mainly devoted to the studies of mathematics and mechanics. His proficiency in these sciences brought him into intimate association with Christopher Polheim, who seems to have enjoyed the unbounded confidence of Charles XII. Swedenborg was in this way introduced to the special notice of Charles, by whom he was appointed in 1716 assessor of the royal board of mines; his commission stating that "the king had a particular regard to the knowledge he possessed in the science of mechanics, and that it was his pleasure that he should accompany and assist Polheim in constructing his various mechanical works." In 1718 he turned his mechanical skill to practical account at the siege of Frederickshald, when, by means of machines of his own invention, he contrived to transport several large vessels, over hills and valleys, a distance of about 14 miles. About this time he published several small works: a proposal for fixing the value of coin, and determining the measures of Sweden, so as to suppress fractions and facilitate calculations; a treatise on the position of the earth and planets; and some others. In 1721 he again travelled, with special reference to preparing himself for the duties of his office of assessor. During this year he published in Latin at Amsterdam six small philosophical treatises; a new edition of one of which, "A Practical Method of finding the Longitude of Places on Land and at Sea by Lunar Observations," was published by him late in life. In 1722 he published at Leipsic "Miscellaneous Observations connected with the Physical Sciences," parts i.-iii., and at Hamburg part iv., principally on minerals, iron, and the stalactites in Bauman's cavern. In 1733 he again went abroad, and in 1733-'4 published in Latin at Dresden and Leipsic his "Principia, or the First Principles of Natural Things, being new Attempts toward a Philosophical Explanation of the Elementary World" (3 vols. fol.), produced in elegant style, with copious engravings, at the expense of the duke of Brunswick. In 1740 he published at Amsterdam "The Economy of the Animal Kingdom;" and in 1744 and 1745, at Amsterdam and London, "The Animal Kingdom," and "The Worship and Love of God." These were the last of Swedenborg's philosophical works. His reputation was now established as one of the profoundest thinkers of the age, and his acquaintance and correspondence were sought by the most distinguished scholars in Europe. Count Hopken, senator, and at one time prime minister of Sweden, says of him that "he was without contradiction the most learned man in my country." In 1724 the consistory of the university of Upsal invited him to accept the office of professor of pure mathematics, because, as they said, "his acceptance would be to the advantage of the students, and the ornament of the university;" which, however, he declined. In 1729 he was admitted a member of the academy of sciences of Upsal, and in 1734 was made a corresponding member of the academy of sciences of St. Petersburg. He was among the earliest members of the royal academy of sciences at Stockholm, and his portrait is in the hall of the academy as one of its past presidents, near that of Linnæus, who was one of its founders. The most important of the works above mentioned have been recently translated into English, and the English reader has been surprised at their vast amount of profound learning and original thought. It is confidently asserted by scientific men who have given them the most careful study, that a number of important discoveries in the different departments of science, which have made other names illustrious, were anticipated by him. These works afford evidence of a remarkably well balanced mind, in which the beautiful and the practical, poetry and mathematics, were harmoniously blended together. His writings always breathe a pure devotional spirit, and persons to whom he was most intimately known, of high and low rank, bear testimony to the excellence of his private character. The following rules of life were found noted down in several of his manuscripts, evidently intended for private use, as they are nowhere met with in his published works: "1. Often to read and meditate on the Word of God. 2. To submit every thing to the will of Divine Providence. 3. To observe in every thing a propriety of behavior, and always to keep the conscience clear. 4. To discharge with fidelity the functions of my employments and the duties of my office, and to render myself in all things useful to society."—Such, as we learn from the most authentic sources, was Swedenborg in the year 1745, at the age of 57, in the full maturity of his powers and his fame. In this year, as he assures us, "he was called to a new and holy office by the Lord himself, who manifested himself to him in person, and opened his sight to a view of the spiritual world, and granted him the privilege of conversing with spirits and angels." No one at all conversant with Swedenborg's writings and character can doubt his sincerity. He regarded his previous studies as having answered their great purpose, as a means of preparation for the far higher use in which he was to be henceforth employed, and in his subsequent writings makes no allusion to his philosophical works. As his office was mainly to reveal the spiritual sense of the Sacred Scriptures, he thenceforth made these his constant and exclusive study. He now commenced the study of the Hebrew, with which he made himself acquainted, that he might read the Old Testament in the original language. It is said that no other books were seen in his study, except the Hebrew and Greek Bibles, and the indexes to his own works which he used for the convenience of reference. There was not the slightest appearance of enthusiasm, but he proceeded in the most deliberate manner; the divine assistance, which he said was vouchsafed to him, not seeming in the least to supersede the exercise of his own mental powers. Neither does he appear to have been in the least elated by his exalted office, but more humble. "This knowledge," he said, "is given to me from our Saviour, not for any particular merit of mine, but for the great concern of the salvation and happiness of all Christians." There was no appeal to the weakness or credulity of the ignorant or the vulgar. Indeed, there was no attempt to make proselytes at all. He had no desire to be the head of a sect, or to connect his own name with the new church which he said was about to be established. He evidently felt as if he were addressing posterity rather than those of the present age; and his works, as they left the press in Latin folio volumes, were distributed by him gratuitously to the universities of Europe, and among the learned, especially the clergy.—In 1747 he asked and obtained leave of Frederic, then king of Sweden, to retire from the office of assessor, a place which he had filled for 31 years. He also requested that one half of his salary should be continued to him, which was readily granted. He says: "My sole object in this resignation was, that I might be more at liberty to devote myself to that new function to which the Lord had called me. On resigning my office, a higher degree of rank was offered me, but this I declined lest it should be the occasion of inspiring me with pride." After 4 years of labor and preparation, the first volume of his theological works appeared in 1749, under the title of *Arcana Cœlestia*, or "Heavenly Arcana, which are contained in the Sacred Scripture, or Word of the Lord, laid open, beginning with Genesis, together with relations of Wonderful Things seen in the World of Spirits and the Heaven of Angels." He was fully aware of the incredulity with which the work would be received with very few exceptions, as he himself tells us. "It is not unknown to me," he says, "that many will say that a man can never speak with spirits and angels while he lives in the body; and many that it is fantasy; others that I relate such things to gain credit, others other things; but I do not hesitate on this account, for I have seen, have heard, have touched." It appears by the original advertisement of the publisher, that he paid £200 for the publication of the first volume of the *Arcana*, and also advanced £200 for the second, and gave direction that all receipts from the sales of the work should be given "toward the charge of the propagation of the gospel." This work, like most of his other theological works, was published without the name of the author. The publication of the *Arcana Cœlestia*, commenced in London in 1749, was completed in 1756, in 8 vols. 4to., setting forth the spiritual sense, in a connected series, of Genesis and Exodus, with explanations of the signification of numerous other passages, which are introduced from other parts of the Scriptures, together with "relations of things seen and heard in the spiritual world," which are found between the chapters. This is much the largest of his theological works. Like all the rest, it is written in good mediæval Latin, divided into distinct paragraphs, all of which are numbered, having copious references from one paragraph to others, in the same or different works, where the subject is treated of. Remarkable method and consistency prevail throughout the whole. In 1758 Swedenborg was again in London, where he published the following named works: 1, "Account of the Last Judgment and the Destruction of Babylon, showing that all the predictions in the Apocalypse are at this time fulfilled, being a relation of things heard and seen;" 2, "Concerning Heaven and its Wonders, and concerning Hell, from things heard and seen;" 3, "On the White Horse mentioned in the Apocalypse;" 4, "On the Planets in our Solar System, and on those in the Starry Heavens, with an Account of their Inhabitants and of their Spirits and Angels;" 5, "On the New Jerusalem and its Heavenly Doctrine, as revealed from Heaven." In 1763 he published at Amsterdam: 1, "The Doctrine of the New Jerusalem respecting the Lord;" 2, "The Doctrine of the New Jerusalem respecting the Sacred Scripture;" 3, "The Doctrine of the New Jerusalem respecting Faith;" 4, "The Doctrine of Life for the New Jerusalem;" 5, "Continuation respecting the Last Judgment and the Destruction of Babylon;" 6, "Angelic Wisdom concerning the Divine Love and Wisdom." In 1764 he published at the same place "Angelic Wisdom concerning the Divine Providence," and in 1766 "The Apocalypse Revealed." He had nearly prepared for the press a much larger work than that last mentioned, in explanation of the Apocalypse, under the title of "The Apocalypse Explained," which he seems to have laid aside for the other. This work has been published since his death, in 4 vols. 4to., containing about half as much matter as the *Arcana Cœlestia*. In 1768, at the age of 80, he proceeded to Amsterdam, where he published the work entitled "The Delights of Wisdom concerning Conjugial Love; after which follow the Pleasures of Insanity concerning Scortatory Love." This was followed in 1769 by the "Brief Exposition of the Doctrine of the New Church," and by the little work entitled "The Intercourse between the Soul and the Body," usually known as the "Treatise on Influx." His last work was published at Amsterdam in 1771, under the title of "The True Christian Religion, containing the Universal Theology of the New Church foretold by the Lord in Daniel, chap. xii. 13, 14, and in the Apocalypse, chap. xxi. 1, 2." This work contains, as its name implies, a complete summary of the doctrines of the New Church. In addition to the works mentioned, he left voluminous manuscripts, which after his death were deposited in the library of the royal academy of sciences at Stockholm, many of which have since been edited and published by Dr. J. F. I. Tafel, professor and librarian in the university of Tübingen. A general summary of the doctrines contained in Swedenborg's theological writings may be found in the article NEW JERUSALEM CHURCH. By far the greater part of them are devoted to the explanation of the spiritual sense of the Sacred Scriptures, and all may be said to be directly or indirectly connected with that subject. After the publication of the "True Christian Religion," Swedenborg went to London, where he seems to have been employed in the preparation of a supplement to that work, entitled "The Coronis or Appendix to the True Christian Religion." On Christmas eve, 1771, he was struck with apoplexy, from which he partially recovered, and remained in complete possession of his mental faculties till the time of his death.—The number of those who received the doctrines promulgated by Swedenborg during his life was very small, but among them were men, both in his own country and in England, distinguished alike for their learning and the purity of their lives, who enjoyed the opportunity of intimate relations with him. Of this number may be named Count Andrew John von Hopken, and Dr. Gabriel Andrew Beyer, professor of Greek literature and member of the consistory of Gothenburg, in Sweden; and in England, the Rev. Thomas Hartley, rector of Winwick in Northamptonshire, who was the first translator into English of some of his theological works, of which a copious index was made by Dr. Beyer. Dr. Hartley visited Swedenborg in his last sickness, a short time before his death, in company with Dr. Messiter, a distinguished physician in London, and asked him "to declare whether all he had written was strictly true, or whether any part or parts thereof were to be excepted;" to which he replied with warmth: "I have written nothing but the truth, as you will have it more confirmed hereafter all the days of your life, provided you always keep close to the Lord, and faithfully serve him alone, in shunning evils of all kinds as sins against him, and diligently search his Word, which from beginning to end bears incontestable testimony to the truth of the doctrines I have delivered to the world." There are a number of well authenticated cases in which Swedenborg communicated facts, his knowledge of which is deemed by the receivers of his doctrines wholly inexplicable without supposing him to have had communication with the spiritual world. He never sought however to make any demonstrations of this kind, nor does he anywhere in his published works appeal to them as evidence of his mission or of the truth of his doctrines, or even mention them. They seem to have been mere incidents of his life. Swedenborg enjoyed the friendship and confidence of the reigning monarchs of Sweden, from Charles XII. onward to the time of his death. His character, however, was marked by the constant absence of all desire for personal distinction or self-aggrandizement, and his habits of life were of the most simple and unostentatious kind. He was never married.—Several lives of Swedenborg have been published, among which in English are the following: "Life of Emanuel Swedenborg, with some Account of his Writings," by B. F. Barrett (New York, 1841); "Biographical Sketch of Emanuel Swedenborg, with an Account of his Works," by Elihu Rich (London, 1849); "Emanuel Swedenborg, a Biography," by James John Garth Wilkinson (London and Boston, 1849); Hobart's "Life of Swedenborg" (Boston, 1831 and 1862). The last named work has passed through many editions, and is generally regarded by the receivers of Swedenborg's teachings as the fullest and most authentic of these biographies.

SWEET BAY. See LAUREL.

SWEET BRIER. See EGLANTINE.

SWEET GUM. See HACKBERRY.

SWEET POTATO. See POTATO.

SWENKENSUND, or SVENKSUND, a sound of the gulf of Finland, lying between Viborg and Frederiksham. Gustavus III., king of Sweden, was defeated here by the prince of Nassau-Siegen in 1789, and conquered him there in turn the succeeding year. On the coast of the sound is the town of Svenksund, with about 1,900 inhabitants.

SWETT, JOHN APPLETON, M.D., an American physician, born in Boston in Dec. 1808, died in New York, Sept. 18, 1854. He was graduated at Harvard college in 1828, and commenced immediately a course of medical study in the office of Dr. Jacob Bigelow of Boston, attended the lectures of the Harvard medical school, and took his degree of M.D. in 1831. Soon afterward he opened an office in New York city, and became connected with the city dispensary. The death of his father having put him in possession of a small property, he resolved to prosecute his medical studies further in the hospitals of Paris, and accordingly sailed for Europe June 12, 1835, and spent nearly the whole of the next 17 months in close clinical study, giving his attention principally to the clinical lectures of the celebrated Louis at La Pitié. In the spring of 1838 Dr. Swett associated himself with several other young physicians of the city in the delivery of an extra-academical course of lectures, his topic being "Diseases of the Chest." This association, known at the time as the Broome street school of medicine, was maintained through two years, courses of lectures being delivered in the spring and autumn. In 1841 several of its members, including Dr. Swett, commenced a spring course of lectures in the college of physicians and surgeons in Crosby street. His lectures, which were delivered from brief notes, were reported in the "New York Lancet," and gave him at once a high reputation. For some years he confined his practice mainly to diseases of the chest. About 1840 he was associated with Dr. Watson as editor of the "New York Journal of Medicine," the organ while it existed of the New York medical and surgical society. In 1842 he was elected one of the physicians of the New York hospital, and in connection with his duties there began to make very thorough and careful researches into diseases of the kidneys, not neglecting however his former speciality of diseases of the chest. His investigations on albuminuria and other diseases of the kidney were protracted through the whole remainder of his life. When failing health compelled him in 1850 to visit Europe, he devoted most of his time while there to the study of microscopy with the French physicist Robin; and in 1852 he published his "Treatise on Diseases of the Chest." In 1853 he was appointed professor of the theory and practice of medicine in the medical department of the university of the city of New York, and delivered a course in the spring of the same year, and another in the ensuing winter.

SWIETEN, Gerard van, a Dutch physician and author, born in Leyden, May 7, 1700, died at Schönbrunn, Austria, June 18, 1772. He was a favorite pupil of Boerhaave, and after a few years' practice was elected to the chair of medicine in the university of Leyden; but his adherence to the Roman Catholic faith, and the sternness and inflexibility of his character, made him so unpopular that he was compelled to resign his professorship. In 1745 he was called to Vienna as physician-in-chief to the empress Maria Theresa, and professor of medicine and anatomy. He was subsequently appointed director of the imperial library, perpetual president of the faculty of medicine at Vienna, director of the medical affairs of the empire, and censor of books. His great medical work, *Commentarii in H. Boerhaavii Aphorismos de Cognoscendis et Curandis Morbis* (5 vols. 4to., Leyden, 1741-'72), is still regarded as of great value for its careful observation, while it has served as the source of many smaller medical works by other authors. He also wrote in French a treatise on military medicine, and left a posthumous *Essai sur les épidémies* (1782).

SWIFT, the general name of the *cypselidæ*, a sub-family of birds generally placed among the swallows, but by some recent German ornithologists ranked as a separate family coming near the humming birds, on account of certain anatomical peculiarities, and particularly of the absence of singing muscles in the lower larynx. The swifts resemble the swallows in habits and in their general form; the bill is more suddenly curved, unprovided with bristles at the base; nostrils very large, oblong, with an elevated margin; wings extremely long, curved, and narrow, with 10 primaries; tarsi short and weak, and more or less feathered; toes short and thick, and all 4 are or may be directed forward, as in no other bird; claws strong and curved; 10 feathers in the tail. They are very swift and graceful fliers, feeding exclusively on insects which they capture on the wing; they are migratory like the swallows, but do not mingle with them and are less hardy; most of them nestle in hollow trees, holes in buildings, or crevices in rocks; some species rear 2 or 3 broods in a season.—In the genus *cypselus* (Illig.) the 2d quill is the longest, and the tarsi are feathered to the base of the toes; it is peculiar to the old world. The common European swift or black martin (*C. apus*, Illig.) is 7½ inches long, with a forked tail; it is blackish brown above with a green gloss, and the throat grayish white. It appears in Great Britain in May, departing in August; great numbers are seen morning and evening, darting about after insects, uttering a shrill scream, the only note; the food consists of very small insects, which are collected in considerable quantity in the mouth, retained by a viscid secretion, before they are swallowed; the extreme shortness of the legs renders walking and rising from a flat surface almost impossible, but the stout toes and sharp claws form admirable clinging organs for climbing in and out the holes where the nests are placed; the nest is bulky and clumsily made, and the eggs, 2 or 3, are pure white; only one brood is raised in a season. The white-bellied swift (*C. melba*, Illig.) is 8½ inches long, grayish brown above and white below, the legs covered with brown feathers; it is common in southern Europe, especially in mountainous regions.—In the genus *chætura* (Steph.) or *acanthylis* (Boie) the tail is very short, about ⅔ of the wings, slightly rounded, the shafts stiffened and extending beyond the feathers as rigid spines; 1st quill the longest; legs covered with a naked skin. The species are found in North and South America, Australia, and the East Indies; they live in flocks, and breed usually in holes of trees, but sometimes in crevices in rocks, and the eggs are usually four. The American swift or chimney swallow (*C. pelasgia*, Steph.) is 5¼ inches long and 12½ in alar extent; it is sooty brown above with a greenish tinge, a little paler on the rump, and considerably lighter from the bill to the breast; it is found from the eastern states to the slopes of the Rocky mountains, arriving from the south by the end of April or beginning of May, and departing during the first half of September. This species naturally makes its nest in hollow trees, but in the neighborhood of man builds in such chimneys as are not used in summer for fires; the nest is made of twigs snapped off from a dead tree during flight, fastened together by viscid saliva, without soft lining, and is generally placed from 5 to 8 feet from the entrance; the eggs are pure white. They pass in and out the chimney with great rapidity, making a whirring sound like distant thunder; there are sometimes 200 in a single chimney; if by chance the nest be loosened by rains and fall, the young cling to the sides of the chimney with their sharp claws; the scratching and rumbling have a very strange sound at night, and many a traveller in thinly settled regions, unaccustomed to these nocturnal disturbances, has been terrified by supposed unearthly noises in the chimney. They do not alight on trees or on the ground.—In the genus *collocalia* (Gray) the bill is very small, wings very long, tail moderate and nearly even, and tarsi naked. The esculent swift or swallow (*C. esculenta*, Gray) is the principal maker of the celebrated nests so highly esteemed by the Chinese as articles of food; these consist of a mucilaginous substance secreted by the greatly developed salivary glands, more or less mixed with fragments of grass and similar materials, and are attached to the surface of rocks in almost inaccessible caves in the islands of the East Indies; the older writers supposed the nests to be made of sea weeds macerated in and rejected from the stomach. These nests are built by 3 or 4 species, and are collected in large quantities, forming an important article of commerce in China; for an account of the mode of collecting, value of the product, and uses to which the nests are put, see BIRDS' NESTS, EDIBLE. The eggs are 2 in this genus. There are many other species of swifts, both in the old world and the new.

SWIFT, JONATHAN, dean of St. Patrick's, a British author, born in Dublin, Nov. 30, 1667, died there, Oct. 19, 1745. He was of purely English descent; his father, Jonathan Swift, emigrated from Herefordshire, and dying in embarrassed circumstances before the birth of his son, left his family dependent upon his brother Godwin. The son's career at Trinity college, Dublin, which he entered in his 15th year, was obscure and unhappy, the logic of the schoolmen, then the beginning and end of the curriculum at Dublin, being distasteful to him, and his pecuniary circumstances such as to prevent him from associating on an equal footing with those he considered his equals. His neglect of the ordinary college studies resulted in his failure at his first application to obtain his bachelor's degree, which was at length conferred upon him in Feb. 1685, *speciali gratia*. This disgrace, however, seems to have aroused in him no other feelings than contempt and resentment; and during his subsequent residence at the university he showed himself so indifferent to academic rules and discipline as to incur within two years no fewer than 70 penalties and censures, beside being compelled to crave public pardon of the junior dean, Dr. Owen Lloyd. In 1688 he left Dublin on a visit to his mother, who was then living in Leicester, England, dependent on the bounty of her relations, one of whom was the wife of Sir William Temple; and a few months later he entered the family of that statesman in the capacity of private secretary. Abandoning his former careless and idle habits, he now employed his leisure hours in study, and from daily intercourse with his patron acquired a familiarity with public affairs which gave to his subsequent political pamphlets a very different character from those produced by mere men of letters. But to one who like Swift was at heart the most haughty, despotic, and sensitive of men, the position of secretary, with a salary of £20, was a heavy price to pay for the advantages he derived; and in after years he alluded with bitterness to the humiliations he endured under the roof of Sir William Temple, whom he was in the habit of addressing with the obsequiousness of a lacquey or a beggar, and a sharp word or cold look from whom sufficed to make him miserable for days. Much of the acerbity which subsequently characterized his intercourse with people of every degree may doubtless be ascribed to this enforced subserviency, aptly likened by Macaulay to the tameness with which a caged tiger submits to the keeper who brings him food. At Moor Park, Temple's seat in Surrey, Swift had frequent opportunities of seeing William III., who was in the habit of consulting the retired statesman on public matters; and on one occasion he was deputed by his patron to persuade the king to consent to the bill for triennial parliaments. The latter failed to be convinced by the arguments of the Irish secretary, of whose intellectual endowments he could have formed no flattering estimate, if his offer to make him captain of a troop of horse may be considered a criterion. In 1692 Swift took his master's degree at Oxford, and two years later, finding Temple unwilling to make any definite provision for him, he renounced his employment and left Moor Park in a pique, intending to take orders in Ireland and look for preferment from some other source. His mortification may be conceived when he discovered that a certificate from Sir William was necessary to enable him to obtain orders; and the letter in which he solicits it, praying that "Heaven would one day allow him the opportunity of leaving his acknowledgments at the feet" of his offended patron, is a curious illustration of the readiness with which he could humiliate himself for the purpose of furthering his own interests. In Oct. 1694, he was ordained, and soon after received the prebend of Kilroot, in the diocese of Connor; but a few months served to weary him of the life of a rural incumbent, and having received a kind letter from Sir William Temple, who felt the want of his services, he gladly returned to his old position and to the elegant retirement and literary resources of Moor Park. He was thenceforth treated with more consideration, and upon the death of Sir William in 1698 received a legacy, coupled with the task of editing his posthumous works, which were published in London in 1699, with a memoir of Temple and a dedication to the king. Although a promise of a prebend of Westminster or Canterbury had been held out to Swift, his claims, unsupported by the influence of Temple, were overlooked, and he was obliged to content himself with the position of chaplain and secretary to Lord Berkeley, one of the lords justices of Ireland, whom in 1699 he accompanied to Dublin. A person named Bush succeeded in supplanting him in the office of secretary, and subsequently in securing the presentation to the rich deanery of Derry, which Berkeley had promised to Swift; whereupon the latter, exclaiming: "God confound you both for a couple of scoundrels!" threw up his chaplaincy in a rage. As some sort of compensation for this disappointment, Berkeley gave him the vicarage of Laracor and several other livings, amounting altogether to nearly £400 a year. In 1700 Swift entered upon the discharge of his parochial duties at Laracor; and about the same time Esther Johnson, with whom he had contracted a tender friendship while they were both dependants of Sir William Temple, came at his invitation, accompanied by Mrs. Dingley, a friend, to reside in the neighborhood. At Moor Park Miss Johnson had passed for the daughter of Sir William's steward; but her personal resemblance to Sir William himself and a variety of other concurring circumstances have rendered it tolerably certain that she was his illegitimate offspring. Younger by 15 years than Swift, who appears to have assisted in her education, she gave him from their earliest acquaintance a love which never wavered in its warmth or constancy; and as the "Stella" of his poems and familiar letters, her name is inseparably associated with his own in a sad and mysterious history. During his previous residence in Ireland Swift had become enamored of a Miss Jane Waryng, the sister of an old college friend; but his offer of marriage was declined by her on considerations of health. Subsequently the lady herself, whom Swift addressed as Varina, reopened negotiations, and received from her former admirer a letter of acceptance, containing such unreasonable and insulting conditions, that further intercourse or correspondence was cut short. Swift's conduct as a parish priest was creditable to himself and his calling; and, though laboring in behalf of an establishment which had neither the respect nor the affection of the people, and with every inducement to neglect his duties, he held regularly three services a week, the average attendance at which rarely exceeded half a score of persons, and in his sermons, characterized by himself as "pamphlets," he preached the doctrines of his church to the best of his ability. In 1701 he made the first of a number of annual visits to England, and published anonymously in London his "Discourse of the Contests and Dissensions between the Nobles and Commons of Athens and Rome," vindicating the conduct of the whig leaders, Somers, Halifax, Harley, and Portland, in respect to the partition treaty, and which was generally attributed to Somers himself or Barnet. He avowed the authorship in the succeeding year, and was immediately admitted into the society of the statesmen he had defended, and into that of Addison, Steele, Arbuthnot, and others of the leading wits of the time. With this period commences Swift's career as an author, although he did not engage actively in writing political pamphlets, his most numerous and in many respects most characteristic performances, until several years later. Some trifles in prose and verse written for the amusement of his friends had already shown him to possess a choice and original vein of humor; but he had signally failed in a series of "Pindaric Odes," his only serious effort in the higher walks of poetry, which called forth from Dryden, who was his kinsman, the remark: "Cousin Swift, you will never be a poet." In 1704 appeared his "Battle of the Books," written at Moor Park in 1697, in support of Sir William Temple's views in the controversy respecting the relative merits of ancient and modern learning. This was succeeded by the "Tale of a Tub," a wild and witty satire upon the Roman Catholics and dissenters, with an occasional allusion to the errors of the church of England, the high church party of which it was his object to exalt. This work had also been completed in manuscript several years previous, and is in every respect one of Swift's most perfect and labored efforts; but it proved an insurmountable obstacle to his hopes of high preferment. After an interval of several years he published in 1708 his "Argument against the Abolition of Christianity," a masterpiece of grave irony; "Sentiments of a Church of England Man in respect to Religion and Government;" the humorous attacks on Partridge the almanac maker, entitled "Predictions for 1708 by Isaac Bickerstaff;" and "Letters on the Sacramental Test," in which he enunciated views on the relaxation of the restrictions upon the dissenters very different from those entertained by the whigs, and which may partially explain his subsequent abandonment of that party. In 1709 he published the only work to which he ever attached his name, "A Project for the Advancement of Religion," dedicated to Lady Berkeley. About this time some efforts were made by Swift's political friends, who began at length to appreciate the value of his services, to secure his preferment; and among other plans proposed was one to make him bishop of Virginia, with a general authority over all the clergy in the American colonies. The public scandal which the appointment of the author of the "Tale of a Tub" to this office would have created probably operated against him on this as on other occasions, and he received nothing beyond the flatteries of men in office and abundant invitations to dinner; while his friend Addison, who had done no more for the whigs than himself, was loaded with solid benefits. Smarting under a sense of neglect, and incensed by the cold reception which Godolphin accorded to his repeated applications for an increased endowment of the Irish clergy, he wavered for a while between whigs and tories, and finally, in Oct. 1710, went over to the latter, by whom he was received with open arms. Harley and St. John became his warm friends, and in the exultation of the moment he wrote to Stella in Ireland: "I stand with the new people ten times better than ever I did with the old, and forty times more caressed." Swift immediately entered the arena of political controversy, and the "Examiner," a weekly paper established by St. John and others in the interest of the ministry, was for more than half a year the vehicle for bitter attacks from his pen upon prominent whig statesmen. His powerful pamphlet on the "Conduct of the Allies," published in Nov. 1711, and which had a considerable influence in bringing the war to a close, raised his reputation to the highest pitch, and he found himself courted by men of rank and station, and in a position to confer substantial favors upon deserving persons, which he is known to have done in a number of instances. But he himself, while dictating, as Dr. Johnson has observed, the political opinions of the English nation, remained unrewarded; and the efforts of Harley and St. John, now become Lords Oxford and Bolingbroke, aided by Mrs. Masham, were unavailing to procure him a bishopric, the queen, under the advice of Archbishop Sharp and other prelates, positively refusing him any high preferment. Upon the failure of an application in his behalf for the vacant see of Hereford, through the opposition of the duchess of Somerset, whom he had lampooned, Swift threatened to withdraw his support from the ministry, but was pacified by his appointment, in Feb. 1713, to the deanery of St. Patrick's cathedral, Dublin, the income of which amounted to £700. Returning to Ireland, after an absence of nearly 3 years, he had scarcely got settled in his deanery when he was summoned back to England to reconcile the difficulties between Oxford and Bolingbroke, which threatened to break up the cabinet. About this time he wrote his "Public Spirit of the Whigs," which reflected so bitterly upon the Scottish nation and nobility that the latter in a body presented a complaint to the queen. In June, 1714, appeared his "Free Thoughts on the State of Public Affairs;" and upon the dismissal of Oxford a few weeks later he gave a noble proof of the strength of his friendship by declining the flattering overtures of Bolingbroke, in order to be of service to the disgraced minister. The death of the queen immediately after this event and the overthrow of the tories sent Swift back to Ireland, where he remained during the next 12 years.—Ever since the arrival of Stella in Ireland his relations with her had been of the most intimate and affectionate character. They saw each other daily when at home, corresponded regularly when apart, and during his frequent absences she superintended his household, indifferent apparently to the scandal which her equivocal position provoked. Soon after his formal adhesion to the tories Swift had become intimate in London in the family of a Mrs. Vanhomrigh, whose eldest daughter, Esther, a spirited, intelligent, and accomplished girl, kindly noticed and occasionally directed by him in her studies, conceived so violent a passion for her tutor as to be induced to propose marriage to him. The offer was declined, but, whether from real interest in Miss Vanhomrigh (who under the name of Vanessa has gained a celebrity as sad and romantic as that of her companion in misfortune, Stella), or from gratified vanity, he neglected to discourage her advances. Upon the death of her mother, Vanessa removed in 1714 to Ireland to be near Swift, who thus found himself involved in a pitiable dilemma, with two women equally devoted to him, and neither of whom he was willing to marry, notwithstanding he had protested to Stella that he "loved her better than his life a thousand million of times." Vanessa, ignorant of Swift's relations with Stella, and absorbed in her own passion, endured his coldness or reproaches without a murmur, in the hope of one day becoming his wife; but to Stella, who had waited patiently for more than 15 years to have this justice done her, the idea of being replaced in Swift's affections by a rival was intolerable, and at her solicitation he is said to have finally consented to a private marriage with her, which took place in the garden of the deanery in 1716. At his express stipulation, however, the matter was kept secret; and as the relations of the parties remained unchanged, and they were never known to meet but in the presence of a third person, it was at the best but a nominal union, and throughout her life his wife commonly passed for his mistress. In 1717 Vanessa retired with her sister to Marley abbey near Celbridge, and for several years lived in deep seclusion. During the illness of her sister in 1720 Swift renewed his visits, each of which Vanessa commemorated by planting a laurel in the garden where they met; but at length, tormented by suspicion and impatience, she wrote to Stella to ascertain the nature of her connection with Swift. The latter, getting possession of the letter, rode directly to Marley abbey, flung it upon the table before Vanessa with a frown which struck her dumb with terror, and instantly departed. The unhappy woman survived this shock but a few weeks, and Swift, overcome by shame and remorse, retired for two months to solitude in the south of Ireland. After her death appeared his poem entitled "Cadenus and Vanessa," describing the manner in which Swift (personified as Cadenus, an anagram of *Decanus*, the dean) received the early advances of Miss Vanhomrigh. Five years later Stella herself dropped into the grave, without any public recognition of her marriage, and with her departed what Thackeray calls "the good angel of his life; when

Stella's sweet smile went, silence and utter night closed over him." Of the various reasons assigned for his conduct toward these two women, of all persons in the world the most devoted to him, that which ascribes it to the malady which finally overwhelmed his reason is the most charitable.—For several years after Swift's return to Ireland he wrote little; but finding Irish affairs likely to prove a fit cover for attacks upon the existing whig government, he produced in 1720 a "Proposal for the Universal Use of Irish Manufactures," followed in 1723 by the celebrated "Drapier's Letters," in opposition to the royal grant authorizing Wood to coin £108,000 in halfpence and farthings for general circulation in Ireland. The author by no means confined himself to the single grievance here alluded to, but denounced the whole system of government in Ireland with a vigor and point which aroused a powerful popular feeling in his favor. His effigy was produced on signs and medals, and distributed broadcast in innumerable prints; and so powerful became his influence with the lower classes that Walpole, when meditating legal proceedings against the author, was told that it would require 10,000 men to arrest him. It may be doubted, however, whether Swift, proud of his unmixed English blood and looking upon the aboriginal inhabitants of Ireland as a servile and alien caste, really valued the popularity which he enjoyed. But with all his affected contempt for the land of his birth, he frequently betrays an instinctive yearning toward it, which has been likened to that felt by the inferior animals for their young. In 1726 appeared his "Gulliver's Travels," the most original and extraordinary of all his productions, and that by which he will be known while the language lasts. Of these wonderful satires on human nature and society Masson observes: "Schoolboys who read for the story only, read Gulliver with delight; and our literary critics, even while watching the allegory and commenting on the philosophy, break down in laughter, from the sheer grotesqueness of some of the fancies, or are awed into pain and discomfort by the ghastly significance of others." In 1726 and 1727 he made visits to England, renewing his intimacy with Pope, Gay, Bolingbroke, Arbuthnot, and others of his early friends; but after the death of Stella he never left Ireland, notwithstanding he was strongly urged to exchange his deanery for a living of less value and importance in Berkshire. His pride revolted against the sacrifice of dignity which this step would involve, and he clung to Ireland, complaining bitterly to Bolingbroke that he should be compelled to die there "in a rage, like a poisoned rat in a hole." For several years he wrote with vigor and increasing bitterness on Irish affairs, and amused himself with composing verses, the humor of which is more than equalled by the fierceness and obscenity of the satire; but by the year 1736 his health became so undermined by frequently recurring attacks of deafness and vertigo, to which he had been subject from an early period of his life, as to preclude further literary labors. His infirmities rapidly increased after this, and in a corresponding degree his memory and intellect decayed. In the latter part of 1740 his memory almost entirely left him, and frequent fits of passion at length terminated in furious lunacy. This subsided in 1742, and he passed the last 3 years of his life in a condition of speechless torpor, tenderly cared for by his cousin, Mrs. Whiteway, who had undertaken the charge of his household. His brain was found loaded with water, and it is supposed that an operation, if it could not have prolonged life, might have restored his reason. He was interred in the cathedral, amid extravagant demonstrations of popular respect, and the tablet which marks his place of sepulture bears the following characteristic inscription written by himself: *Hic depositum est corpus Jonathan Swift, S. T. P., hujus ecclesiæ cathedralis decani: ubi sæva indignatio ulterius cor lacerare nequit. Abi, viator, et imitare, si poteris, strenuum pro virili vindicem. Obiit*, &c. With a presentiment of his fate he had bequeathed the bulk of his property, amounting to £10,000, to found a hospital for insane persons.—In person Swift was tall and well made, with a swarthy complexion, and a cast of face that would have been heavy but for the expression communicated to it by the eyes, which Pope describes as "azure as the heavens." Under the influence of anger his features assumed an austerity which awed and frightened most persons. His character, seemingly made up of paradoxes, is still an enigma to many. Economical almost to the verge of parsimony, he reserved a third of his income for charities; brutal, overbearing, and coarse in his manners, he was constantly performing acts of kindness in private; assuming in the treatment of religious subjects a levity of manner which subjected him to the charge of irreverence, he was at heart reverent and pious; indifferent generally upon whom the lash of his satire descended, and having hosts of bitter enemies, he possessed friends who almost idolized him; honest and straightforward in his intentions, and sincerely hating cant, he "bound himself to a lifelong hypocrisy;" and despising women for their intellectual dependence upon man, and frequently grossly insulting them, he yet loved a woman with an exclusiveness and earnestness for which he has never perhaps received full credit. An intense and arrogant desire for power and notoriety characterizes every prominent action of his life. "All my endeavors from a boy to distinguish myself," he writes to Bolingbroke, "were only for want of a great title and fortune, that I might be used like a lord by those who have an opinion of my parts—whether right or wrong, it is no great matter;" and it may be supposed, after this humiliating confession, that the scruples which he at first honestly entertained, and probably never relinquished, as to the propriety of entering the church merely for support, were readily silenced. "But having put the cassock on," says Thackeray, "it poisoned him; he was strangled in its bands. He goes through life tearing like a man possessed with a devil;" and to the consciousness of the false part he was enacting and of the sordid motive which guided his literary labors, may doubtless be ascribed much of the suffering of the man who was accustomed to observe the anniversary of his birth as a day of mourning, and whom Archbishop King once called "the most unhappy on earth." He is preëminently the British satirist of his age, reflecting in all his writings what Masson calls "the mad, the obscene, the ghastly, the all but infernal and yet infinitely sorrowful humor" of Rabelais, with a genius peculiarly his own. Of real elevation or sympathy with what is beautiful or sublime he seems to have been utterly destitute, and his poetry, written principally in the octosyllabic verse cultivated by Prior and Gay, though remarkable for ease and felicity of expression and rhyme, as also for its peculiar and inimitable humor, is frequently coarse and indecent beyond that of any other writer of the time, the author apparently dwelling with a morbid pleasure upon images of pure physical disgust and loathsomeness. It is but just however to add that his grossness is always repulsive, not seductive; and that the most offensive pieces were written at a period of his life when disease and despair had begun to obscure his mental faculties.—Some posthumous works of Swift were published long after his death, including "A History of the four last Years of Queen Anne;" "Polite Conversation," a satire on the frivolities of fashionable life; and "Directions for Servants." A complete edition of his writings was published in 19 vols. by Sir Walter Scott, whose biography of him is still the standard one. That by Dr. Johnson, in his "Lives of the Poets," reflects too closely the dislike which the biographer always entertained for Swift. There is also a copious life by Thomas Sheridan, and an account of his latter years by Dr. Wilde of Dublin, written on the occasion of the remains of Swift and Stella being exhumed, during some repairs in St. Patrick's cathedral, in 1835. The character of Swift is also the subject of an elaborate and in some respects unnecessarily severe essay by Thackeray, included in his "British Humorists."

SWIFT, Joseph Gardner, an American general and civil and military engineer, born in Nantucket, Mass., Dec. 31, 1783. In 1800 he entered the army as a cadet at Newport, R. I., and in 1802 became the first graduate of the military academy at West Point. He was then made 2d lieutenant in the U. S. corps of military engineers, and in 1807, having attained the rank of captain of engineers, he was appointed to the command of West Point. In 1812 he had reached the rank of lieutenant-colonel, and was made aide-de-camp to Major-Gen. Pinckney in the Carolinas, and the same year succeeded Col. Jonathan Williams in the command of the U. S. corps of engineers, with the rank of colonel. For meritorious services in the campaigns of 1813 and 1814 on the St. Lawrence river, and in defence of the city and harbor of New York, he was brevetted as brigadier-general, and honored by special marks of distinction from the city authorities. After the war he was for several years successively director, superintendent, and inspector of the military academy, still holding his commission as chief engineer of the army until 1818, when, with a number of other officers of the corps, he left the service on the appointment by the president of a distinguished French officer, Gen. Bernard, to the charge of investigating and modifying the coast defences. Gen. Swift was afterward surveyor of the port of New York for 9 years, then civil engineer of the Baltimore and Susquehanna railroad, and from 1829 to 1845, under appointment from President Jackson, superintendent of the harbor improvements on the lakes, removing to Geneva, N. Y., where he has since resided. In the winter of 1830–'31 he constructed the railroad from New Orleans to Lake Pontchartrain, through what was considered an unfathomable swamp, susceptible of neither draining nor piling. This, it is believed, was the first railroad in the United States provided with an iron T rail. It was constructed of massive frames of cypress logs obtained in clearing the way through the swamp, and laid upon a filling of the tertiary fossil shells from the mounds composed of these materials discovered in the swamps. These shells, thus brought into use, were afterward applied, by the advice of Gen. Swift, to the construction of the well known "shell road" to Lake Pontchartrain, and to the completion of the streets in New Orleans. In 1838 Gen. Swift was chief engineer of the Harlem railroad in New York. In 1841 he was sent by President Harrison on an embassy of peace to the governors of Canada, New Brunswick, and Nova Scotia. In 1851 and 1852, with his son McRay Swift, C.E., he made the tour of Europe, and recorded his observations in his diary, a work kept from his boyhood, and in which is a complete history of the military academy at West Point, together with the biography of President Madison and other eminent public men, and essays upon scientific and literary subjects. He has contributed many valuable papers to scientific journals on the exact and natural sciences and their practical applications. Of his sons two have died in the service of their country, one as civil engineer, from exposure; and the other, a distinguished officer of the U. S. engineers, died in Mexico during the war. Another son, Jonathan Williams, an officer in the U. S. naval service, was crippled for life on board the frigate Brandywine.

SWIFT, Zephaniah, an American judge, born in Wareham, Mass., in Feb. 1759, died in

Warren, O., Oct. 27, 1823. He was graduated at Yale college in 1778, and established himself in the practice of law at Windham, Conn.; was a member of congress from 1793 to 1796; was secretary of the mission to France in 1800; and in 1801 he was elected a judge, and from 1806 to 1819 was chief justice of the state. In 1814 he was a member of the Hartford convention. He published a "Digest of the Law of Evidence," and a "Treatise on Bills of Exchange" (1810); and a "Digest of the Laws of Connecticut" (2 vols., 1823).

SWIMMING, the art of sustaining the body at the surface of the water, and moving in it, by the aid of the hands or feet, or both acting in unison. Although not a natural faculty of man, there is little difficulty in acquiring the art of swimming, since the human body, except in the case of persons remarkably spare and lean, is specifically lighter than salt water, and hardly perceptibly heavier than fresh water. As to methods, the frog is the best model. The body being inclined at an angle of 45°, the breast downward, the head thrown back, the elbows close to the chest, the arms flexed, the palms downward, and the thumbs brought together near the chin, the knees drawn up but spread apart, and the soles of the feet directed outward and made hollowing by the contraction of the toes, the first movement is the simultaneous one of the hands and feet, the former with the palms still downward describing a horizontal curve of from $\frac{1}{8}$ to $\frac{1}{4}$ of a circle, while the latter are thrown vigorously backward and outward, so that the inner surface of the leg and thigh, as in the case of the frog, shall offer its resistance to the water. Swimming on the back varies very slightly from this in the muscular motions required, though the position of the swimmer is more nearly horizontal, and the hands need not play so important a part; it is possible to swim a long time with the use of the feet only, but not so long with the hands alone, in case of the loss or paralysis of one of the legs. "Treading water," or swimming in a nearly perpendicular position, by a moderate motion of the feet and a slow spreading of the hands, is a method frequently resorted to by good swimmers as a relief from the other modes. In order to float on the back, the swimmer turns himself, and suffers the back of the head to be submerged, the mouth and nose only being above water; the hands are extended, and the legs partially flexed, and spread so as to afford the greatest possible floating surface. In a calm sea, a person may thus lie on the surface for hours, without danger of drowning.—Various plans have been suggested to communicate confidence and self-possession to the learner. Corks, swimming bladders, and life preservers of tin, India rubber, &c., have been used extensively. Dr. Franklin's and Gen. Pfuel's methods are perhaps the best, the one to inspire confidence, and the other to acquire, with a feeling of perfect safety, the muscular movements in their regular order and sequence. Franklin's directions were, that the learner should take with him an egg or large white pebble, and, wading out till the water was full breast high, face about, and toss the egg or pebble into the water between himself and the shore, yet where it is so deep that he can only reach it by diving, and then plunge after it; in so doing he will find himself buoyed up by the water, and learn, in struggling to reach it, that it is easier for the human body to swim than to sink. By Gen. Pfuel's method a swimming girdle of hemp, about 5 inches wide, was passed loosely around the chest, just under the arms, and to the back of this a ring was attached in which was tied a rope 5 or 6 fathoms in length which could be fastened at will to a pole 8 feet long. The swimming bath or place was to have about 8 feet depth of water, and a rail 4 feet in height above the water protected the platform. From this rail the learner was required to leap, the teacher holding the rope firmly; when in the water, being sustained by the rope, now attached to the pole, the legs and arms stretched out and held firmly together, the chin touching the water, he was directed to assume the position above described at the call of the teacher, "One" being the signal for placing the legs in position, "Two" for the extension of the legs at the widest possible angle, the toes being still contracted and kept outwards, and "Three" for the return to the original position. The learner was exercised in these positions till he could perform them promptly and rapidly, and was then trained in the motions of the hands and arms, and subsequently in the union of the two; he was next allowed to swim, feeling less and less the support of the rope, till it could be cast loose with safety. In most cases a training of one or two lessons daily for 2 or 3 weeks suffices to enable the learner to swim for a half hour without much fatigue, and practice is then only necessary to perfect him.—In leaping or diving the swimmer must keep the muscles firm and the limbs straight and stiff, as to strike the water first with the abdomen, side, or back may be attended with serious consequences. In attempting to save a person from drowning, the swimmer should not allow the drowning person to seize one of his limbs, or to clasp him in his arms, as he will not only be unable to save him, but will himself inevitably be drowned; he should approach him from behind, and if he sinks pull him up by his hair, or raise him by placing the hands under the arm pits; if he is an exhausted swimmer, he may be supported by placing his hand on the shoulder of the swimmer who would save him.—An illustrated treatise on swimming, with full directions for learners, may be found in Walker's "Manly Exercises" (11th ed., London, 1860).

SWINE. See Hog.

SWITZERLAND, a S. E. co. of Indiana, bordering on Kentucky, from which it is separated by the Ohio river; area, 220 sq. m.; pop. in 1860, 12,698. The surface is undulating and the soil fertile. The productions in 1850 were 401,884 bushels of Indian corn, 78,169 of wheat, 44,455 of oats, and 9,769 tons of hay. There were 8 grist mills, 12 saw mills, 4 tanneries, 27 churches, and 3,541 pupils attending public schools. It was settled by Swiss in 1802. Capital, Vevay.

SWITZERLAND (Lat. *Helvetia ;* Ger. *Schweiz;* Fr. *La Suisse*), a federal republic of central Europe, situated between lat. 45° 50′ and 47° 50′ N., and long. 6° and 10° 25′ E. It is bounded N. and E. by Germany, S. by Italy, and W. by France, and nearly the entire boundary line is formed by rivers (the Rhine and Doubs), lakes (of Constance and Geneva), and mountains (the Alps and Jura). In its greatest length, which is near the parallel of 46° 35′ N., it measures 216 m.; in its greatest breadth, a little W. of the meridian of 9° E., 140 m. In 1862 Switzerland consisted of 22 cantons, or, as 3 cantons, Unterwalden, Appenzell, and Basel, are divided into 2 independent half cantons each, of 25 states, the area and population of which are exhibited in the following table:

Cantons.	Area, sq. m.	Pop. in 1850.	Pop. in 1860.	Catholics.	Reformed.	Capitals.
Zürich	659	250,698	267,641	11,497	254,908	Zürich.
Bern	2,615	458,301	468,516	58,572	406,862	Bern.
Lucerne	502	132,843	130,965	128,248	2,697	Lucerne.
Uri	418	14,505	14,761	14,722	39	Altorf.
Schwytz	358	44,168	45,191	44,649	539	Schwytz.
Unterwalden Obwalden	186	13,799	13,399	13,304	95	Sarnen.
Unterwalden Nidwalden	112	11,339	11,561	11,506	55	Stanz.
Glarus	265	30,213	33,459	5,866	27,563	Glarus.
Zug	91	17,461	19,667	19,035	622	Zug.
Freyburg or Fribourg	632	99,891	105,970	90,362	15,578	Freyburg.
Soleure or Solothurn	292	69,674	69,527	59,799	9,626	Soleure.
Basel City	15	29,698	41,251	9,996	30,826	Basel.
Basel Country	166	47,885	51,778	9,824	41,721	Liesthal.
Schaffhausen	118	35,300	35,646	2,080	33,489	Schaffhausen.
Appenzell Outer Rhodes	102	43,621	48,604	2,243	46,329	Herisau and Trogen (alternately).
Appenzell Inner Rhodes	61	11,272	12,020	11,896	123	Appenzell.
St. Gall	781	169,625	181,091	111,087	69,802	St. Gall.
Grisons or Graubündten	2,705	89,895	91,177	39,008	52,166	Chur or Coire.
Aargau or Argovie	538	199,852	194,600	88,588	104,885	Aarau.
Thurgau or Thurgovie	384	88,908	90,347	22,152	67,861	Frauenfeld.
Ticino or Tessin	1,069	117,759	131,396	131,241	118	Lugano.
Vaud	1,226	199,575	213,606	12,981	199,465	Lausanne.
Valais	2,019	81,559	90,880	90,169	697	Sion or Sitten.
Neufchâtel	309	70,753	87,847	9,349	77,476	Neufchâtel.
Geneva	111	64,146	83,345	42,855	40,266	Geneva.
Total	15,747	2,392,740	2,534,240	1,040,469	1,488,298	

The statement of the area of the several cantons rests on the trigonometrical calculations recently made under the direction of Gen. Dufour; but that of the cantons of Bern, Uri, Lucerne, and Unterwalden is based upon an approximative estimate. The population has increased since 1816 about 50 per cent., more slowly than that of the United States and Great Britain, but in a larger ratio than that of France. Geneva, Basel, and Neufchâtel have increased nearly 100 per cent.; Lucerne and Bern more than 50; Zürich nearly 50; while Uri, Appenzell, Unterwalden, and Schaffhausen have remained nearly stationary. Since 1850 Lucerne, Obwalden, Soleure, and Aargau show a small decrease. In 1850 there were 92 towns, 63 hamlets, and 6,800 villages. The population of the towns was 492,600; the largest are Geneva, Bern, Basel, and Zürich. The difference of language still existing points to the difference of origin of the inhabitants of the several cantons. The N., N. E., and central cantons speak a German dialect; the French prevails in the cantons of Vaud, Geneva, and Neufchâtel, and in a part of the cantons of Valais, Freyburg, and Bern; the Italian in the canton of Ticino and in a part of Grisons; and the Romansh, a corrupted dialect of the Latin, which has been supposed to come near the colloquial dialect alleged to have been in use among the Romans, in a part of Grisons. The population speaking these 4 languages is estimated by Kolb (*Handbuch der vergleichenden Statistik*, 1860) as follows: German, 1,750,000; French, 550,000; Italian, 130,000; Romansh, 45,000.—Switzerland is one of the most remarkable countries of the globe for its magnificent and picturesque scenery. It is the most mountainous district of Europe, and, with the Tyrol and Savoy, the most elevated. Even the most level part in the N. presents mountains rising upward of 2,000 feet. It is covered throughout its whole extent by the Alps, of which the 3 following groups, with their various offshoots, belong properly to Switzerland: 1, the Helvetian or Lepontine Alps, which, commencing near Monte Rosa, run through Valais on both sides of the Rhône, by St. Gothard, to the Moschelhorn and the Bernhardino in the Grisons, and separate Switzerland from Lombardy; 2, the Rhætian Alps, which run from the Bernhardino through the whole of the Grisons and the Tyrol, and southward to Monte Pelegrino; 3, the Pennine Alps, which border upon Valais, and separate that canton from Savoy and Piedmont. As to their height the Alps are generally divided into the High Alps, rising from 8,000 to 15,000 feet above the level of the sea, and covered with perpetual snow and ice; the Middle Alps, beginning at about 5,500 feet above the sea, and rising to the line of perpetual congelation; and the Low Alps, commencing with an elevation of about 2,000 feet. The principal Alpine summits are

Monte Rosa in Valais, 15,150 feet; the Mutterhorn in Valais, 14,784; the Finsteraarhorn in Bern, 14,106; the peak of the Furca, Mt. St. Gothard, 14,037; the Jungfrau in Bern, 13,718; the Mönchhorn in Bern, 13,498; the Schreckhorn in Bern, 13,386; and the Eiger in Bern, 13,075. Beside these, there are 4 summits ranging from 13,000 to 12,000; 8 from 12,000 to 11,000; 9 from 11,000 to 10,000; and 19 from 10,000 to 6,400. To the west of the Alps, along the boundaries of France, runs a ridge of the Jura mountains lower than the Alps, but presenting many picturesque points of scenery and beautiful valleys. The Jura is united with the Alps by the Jorat, which runs through the canton of Vaud. The glaciers of Switzerland are the reservoirs which feed some of the largest rivers of western Europe. The Rhine and Rhône rise in Switzerland. The former has its 3 sources, the Upper, Middle, and Further Rhine, in the Rhætian Alps, and pursues in Switzerland or on its E. and N. borders a course of above 200 m. Among its affluents is the Aar, which rises in the S. E. mountains of Bern, receives the Simmen, Saane, Emmen, Reuss, and Limmat, and carries to the Rhine the waters of 14 cantons. The Rhône, which rises in a glacier of the Furca, receives the Visp, Borgne, and Dranse, and after quitting the canton of Geneva becomes a French river. The Ticino flows through the canton to which it has given its name, and passes through Lago Maggiore into Italy; and the Inn waters a part of the canton of Grisons. Switzerland contains a considerable number of lakes, the most important of which are the lake of Geneva, the ancient Lemanus, and those of Constance, Neufchâtel, Bienne, Lucerne, Zürich, Zug, and Sarnen; and S. of the Alps the lake of Lugano and the Lago Maggiore. Most of these lakes are traversed by steamboats.—The more marked geological features of Switzerland have been noticed in the articles ALPS and JURA; and the glacial phenomena of the former mountains, which have been most carefully studied, and which throw so much light upon the dynamics of geology, have been specially treated in the article GLACIER. No country possesses greater interest for geologists than Switzerland, whose formations are exhibited upon the grandest scale, and reveal in the most striking manner the metamorphism to which rocks are subject, converting strata of comparatively recent formation into schistose and crystalline rocks; but its mineral resources are of no great importance. Its iron mines produce from 10,000 to 15,000 tons annually; its lead mines 500 tons; and its copper mines about 250 tons. Anthracite of inferior quality is found in several places, as Outre-Rhône, Salvaut, and Isérable, in Valais, &c. The salt mines near Basel yield about 11,000 tons annually, and those at Bex (Vaud) 2,000 tons. Gypsum is found with the salt. The other mineral products are of little importance, with the exception of the mineral springs, of which there are a large number, and among them many famous as watering places. The most celebrated are Leuk (Valais), St. Maurice in the valley of Engadin (Grisons), Pfeffers (St. Gall), Baden (Aargau), and Schinznach (Aargau).—To the tourist Switzerland presents a great abundance of natural curiosities. There are many points of view whence the semi-circular array of Alpine peaks, presented at once to the eye, extends for more than 120 m., and comprises between 200 and 300 distinct summits, capped with snow, or bristling with bare rocks. Of the heights commanding such Alpine panoramas the Righi is probably the finest, as it is certainly one of the most accessible; some give preference to the Faulhorn, from its proximity to the great chain, and the High Alps rising close at hand are seen from it to great advantage. For a near view of Alpine scenery, amid the recesses of the mountains, the spots which afford a concentration of the grandest and most sublime objects are the valleys of the Bernese Oberland, those which descend from the Monte Rosa, especially the valleys of Zermatt in Valais and Macugnaga in Piedmont, and those around the base of Mont Blanc, including Chamouni in Savoy. In these districts, the glaciers, the most characteristic feature of the country, are seen to the greatest advantage. Switzerland has numerous waterfalls. The fall of the Rhine deserves the first rank from the volume of water; but it is rather a cataract than a cascade, as it wants height. Other celebrated falls are: the fall of the Aar, at Handeck, Bern; the Staubbach or Dust fall, in the Bernese Oberland; the Giesbach, on the lake of Brienz; the fall of the Sallenche, near Martigny, Valais, sometimes called Pissevache; Reichenbach falls near Meyringen; the fall of Pianazzo on the Splügen, Grisons; and the Tourtemagne fall, near the Simplon road, in Valais. The principal and most interesting of the Swiss Alpine passes are the Simplon, the St. Gothard, the Splügen, and the Bernardin, both as regards their scenery and the magnificent and skilfully constructed carriage roads which have been made over them. Of passes not traversed by carriage roads, the most striking in point of scenery are those of the Monte Moro and Cervin under Monte Rosa, between the Valais and Piedmont; the Tête Noire and Col de Balme, leading to Chamouni; the Grimsel, Furca, and Gries, branching off at the head of the valley of the Rhône; the Gemmi, between Bern and Valais, one of the most singular of the passes; and the Great St. Bernard, chiefly visited on account of its celebrated *hospice*. Of the Alpine defiles no other approaches the ravine of the Via Mala, on the Upper Rhine in Grisons, one of the most sublime and terrific scenes anywhere among the Alps. The gorge of the Schöllenen on the St. Gothard, that of Gondo on the Simplon, and that extraordinary glen in whose depths the baths of Pfeffers are sunk, also deserve mention. The *Ranz des Vaches* (Ger. *Kuhreihen*) are a class of melodies prevailing among and peculiar to the Alpine valleys. Almost every valley has an air of its own, but the original air is said to be that of Appenzell.—The climate is more severe than might be expected from the geographical position of Switzerland. On the highest summits snow and ice are perpetual. In the lower mountains and on the table land snow falls in greater abundance than in other countries of the same latitude in Europe. In Valais the fig and grape ripen at the foot of ice-clad mountains, while near their summits the rhododendron and the lichen grow at the limit of the snow line. The canton of Ticino has the climate of Italy, yet the weather is more changeable. Switzerland is on the whole a very healthy country, with the exception of a few places in swampy or very narrow and deep valleys. In the middle ages the country of the Jura suffered much from earthquakes, which have entirely ceased for several centuries; but floods, avalanches, and snow storms still threaten the inhabitants with frequent dangers. About two thirds of the surface consists of lakes and other waters, glaciers, naked rocks, and other uninhabitable heights. Some districts are very fruitful, yet the grain raised is not sufficient for the supply of the population. The vine is cultivated on the slopes of the Jura and in the valleys of the Rhine, Rhône, Reuss, Limmat, and Thur (an affluent of the Rhine), and in some places ripens at 2,100 feet above the sea. Flax and hemp are extensively grown. Irrigation is judiciously managed, and in general agriculture is making progress. The forests cover about 17 per cent. of the soil, and although their cultivation is yet imperfect, the production of timber exceeds the home consumption. Fishing still yields considerable produce, but hunting is no longer practised to the same extent as formerly; the chamois has become rare, and the ibex is no more found. Switzerland is celebrated for its rich and excellent pastures; the finest breeds of cattle are those of the Simmenthal (Bern), Gessenay, Gruyère (Freyburg), Zug, and Schwytz. There are about 900,000 horned cattle, about one fourth of which are milch cows, 105,000 horses, 469,000 sheep, 847,000 goats, and 818,000 swine. The sheep and swine do not supply the home demand. The best cheese is made in the Emmenthal, Saanenthal, and Simmenthal, in Gruyère and Urseren (Uri), and in the valleys of the Emmen, Saane, and Simmen.—Eastern Switzerland has been for more than 150 years the seat of flourishing manufactories. To a smaller degree manufacturing industry prospers in the W. and N. cantons. The chief seats of the cotton manufacture are Appenzell and St. Gall; silks are woven in Zürich and Basel, and linens at Bern. Of great importance is the manufacture of watches in the W. cantons, and they constitute an important article of export.—The commerce of Switzerland stands in fair proportion to its well developed industry. The value of the foreign trade in 1855 was set down at $90,000,000, and of the domestic trade at $185,000,000. It increased rapidly until 1858, since which it has decreased somewhat, though not probably below the value in 1855. Most of the duties being specific, it is easier to state the quantity of the articles imported or exported than their values. The rapid increase of the quantity of breadstuffs and coal imported into Switzerland gives ample proof of the development of its industry and the prosperity of its population. In 1855 there were imported only 480,605 cwt. of coal, but in 1860 no less than 2,270,975 cwt. Of breadstuffs (grain, flour, rice) the importation increased from 2,842,191 cwt. in 1850 to 3,717,770 cwt. in 1860; of potatoes, from 81,870 cwt. in 1858 to 877,825 cwt. in 1860. The following statement shows the quantities of the principal articles of import and export during the years 1859 and 1860:

IMPORTS.

Articles.	1859.—Cwt.	1860.—Cwt.
Breadstuffs........................	2,706,070	8,717,770
Potatoes........................	104,940	877,825
Coal and coke........................	1,561,805	2,270,975
Raw cotton........................	254,404	882,041
Cotton yarn and twist...........	6,056	7,474
Cotton goods........................	44,686	88,988
Distilled liquors....................	78,089	88,840
Butter and lard	27,848	84,785
Chicory........................	52,294	55,215
Pig and sheet iron, wire, &c......	298,488	849,878
Cast iron, steel, and hardware....	110,678	127,889
Glassware........................	48,880	84,768
Coffee	141,859	180,060
Salt........................	268,599	258,852
Silk, raw and floss................	88,884	85,929
Tobacco	100,141	106,187
Worsted and woollen goods......	88,806	42,818
Wine........................	786,204	575,407
Sugar and molasses................	219,255	205,851

EXPORTS.

Articles.	1859.—Cwt.	1860.—Cwt.
Cotton yarn and twist...........	21,618	25,962
Cotton goods........................	147,688	165,991
Raw cotton........................	15,710	16,114
Iron, steel, and hardware.........	19.595	81,981
Breadstuffs and peas.............	27,582	28,218
Wooden ware and furniture.....	9,857	11,481
Cheese	140,892	146,789
Machines and parts of machinery	58,967	48,480
Silk and mixed silk goods........	82,188	28,784
Raw and floss silk................	9,867	10,768
Watches........................	2,188	1,790
Absinthe........................	8,989	9,047
Straw goods........................	8,566	4,228
Worsted and woollen goods......	2,214	8,175

The total revenue from customs in 1859 was $1,480,821, and in 1860 $1,558,185, of which sum the current expenses of the customs department take 11 per cent., and $500,000 is distributed among the different cantons to indemnify them for their former customs revenues, leaving about $800,000 to the federal treasury.—The aggregate length of all chartered railroad lines, Jan. 1, 1860, was 358 leagues. Of these there were in operation 197 leagues, in course of construction 62, not yet commenced 99. The most important lines are: united Swiss railroad, 66 leagues; central railroad, 54; northeast, 37; western, 37; eastern and western, 36; Italian, 33; Lukmanier, 26; Freyburg and Lausanne, 17 leagues. The aggregate length of electric telegraph, Jan. 1, 1861, was 601 leagues, the number of stations 145, and the total number of telegrams, not including those passing through Swiss territory from foreign countries, was 259,849 in 1859 and 276,968 in 1860. The revenue was $117,728 in the former year, and $97,657 in the latter; the expenditure $100,993 in 1859, and $87,971 in 1860.—Switzerland has 3 universities, at Basel, Bern, and Zürich, the 2 latter of which were founded in the present century after German models. There are also 2 academies, at Geneva and Lausanne, at which theology, law, and philosophy are taught; and 8 lyceums, at Sion, Einsiedeln, Schaffhausen, Lugano, Chur, Lucerne, Freyburg, and Soleure, each having faculties of theology and philosophy, and some also of law. All the universities and academies are Protestant, and all the lyceums except that at Schaffhausen are Roman Catholic institutions. There are gymnasia and cantonal schools in nearly every canton. The new federal constitution of 1848 provided for the establishment of a federal university (the 3 above mentioned being cantonal institutions), and a committee appointed for drafting a plan submitted its report in 1851 to the federal diet; but the conflicting claims of several cantons as to the location of the university, and of the Reformed and Roman Catholic churches as to its organization, have hitherto prevented the execution of the plan. A federal polytechnic shool was, however, founded in 1854 at Zürich, and soon attained a high degree of prosperity and celebrity. The number of public schools amounts to about 5,500, educating upward of 350,000 pupils. The expenses of public instruction are partly paid by the communities (about 4,500,000 francs), partly by special school funds, and partly by appropriations of the cantonal governments (about 900,000 francs). Many private educational institutions have gained a world-wide celebrity since the days of Pestalozzi and Fellenberg, who conducted establishments of this kind at Yverdun (Vaud) and Hofwyl (Bern). A majority of the inhabitants are Protestants, but the Roman Catholics are most numerous in 11 cantons and one half canton, viz.: Lucerne, Uri, Schwytz, Unterwalden, Zug, Freyburg, Valais, Soleure, Ticino, St. Gall, and Geneva, and Appenzell Inner Rhodes. They have 5 bishops, viz.: of Basel (residing at Soleure), Chur, St. Gall, Lausanne (residing in Freyburg), and Sion. The whole of the canton of Ticino and a few congregations in Grisons were formerly under the jurisdiction of the archbishop of Milan and the bishop of Como in Lombardy; but the government of Ticino as well as the federal government have protested against the continuance of this relation, and demanded of the pope the establishment of a new Swiss bishopric in that canton. The Jesuits and Redemptorists are by an express provision of the federal constitution excluded from Switzerland, and the number of the convents of other religious orders has been somewhat reduced during the present century, yet it still amounts to over 100. The Protestants belong mostly to the Reformed church, which is considered the state church in all the cantons except Lucerne, Uri, Schwytz, Unterwalden, Zug, Freyburg, Soleure, Valais, and Ticino, which have but an insignificant Protestant population. Since 1857 deputies of the Reformed cantonal churches meet annually in a Helvetic conference. Faculties of Protestant theology are connected with the universities of Bern, Zürich, and Basel, and there are also several theological schools in French Switzerland. Basel is the seat of the greatest missionary and Bible society of continental Europe, while the religious societies of French Switzerland have their centre in Geneva. Free churches (Presbyterian or Independent) have been formed during the present century by secession from the state churches, and are especially numerous in the cantons of Geneva and Vaud, in each of which they have also a theological school. The Methodists and Baptists have congregations in several cantons, and the former also a book concern at Zürich. In 1860 the number of Jews, who live mostly in a few communities of the canton of Aargau, was about 800. The number of periodicals published in Switzerland at the close of 1860 was precisely 300, of which 9 were published daily, 28 6 times a week, 20 3 times a week, 56 semi-weekly, 117 weekly, 21 twice a month, and the remainder monthly. The total number was increased in 1861 to 318, of which 210 were in German, 78 in French, 9 in Italian, and 3 in Romansh. The proportion of periodicals to the population is 1 to 7,976, while in France it is only 1 to 26,400. In 7 years, from 1853 to 1860, the aggregate number of copies of periodicals issued in Switzerland increased from 9,484,000 to 16,600,000.—The present federal constitution of Switzerland, which superseded the federal contract of Aug. 7, 1815, and changed the federal union of states into a federal republic, was promulgated Sept. 12, 1848. It provides that all the rights of sovereignty which are not expressly transferred to the confederacy are exercised by the 25 cantons and half cantons. Among the prerogatives of the federal government are the rights of declaring war, of concluding peace or treaties, and of sending diplomatic representatives. The formation of separate alliances between the cantons, without special permission, is prohibited. The constitution of every canton is guaranteed, if it is republican in form, if it has been adopted by the people, and if it can be revised on the demand of a majority of the citizens. All Swiss are equal before the law, and the former relation of subjects as well as all privileges of place or birth are abolished. All Swiss who are Christians have the right of settling in any canton, and of acquiring full civil rights. All recognized Christian denominations enjoy liberty of religious worship. Liberty of the press, of petition, and of association is guaranteed; but the Jesuits and all religious orders and associations which are affiliated to them are prohibited. The confederacy has the right of sending away dangerous foreigners. The legislative power is vested in the federal assembly, which consists of a national council (*Nationalrath*) and a council of states (*Ständerath*). The national council consists of deputies of the people, in the ratio of about 1 for every 20,000 persons, so that every canton and every independent half canton possesses the right of electing at least 1 councillor. The electoral law of Dec. 1850, divided Switzerland into 48 electoral districts, which elect 120 delegates. The national council is elected for the term of 3 years, and every citizen who is 20 years of age has the right of voting and is eligible. Naturalized citizens may be elected after having been citizens for 5 years. The national council elects for every regular and every extraordinary session a president and vice-president, the former of whom is not eligible during the next following regular session. The council of states has 44 members, 2 for every canton and 1 for every half canton. The members of the national council are paid out of the federal treasury, those of the council of states by the cantons. The executive power is exercised by a federal council, consisting of 7 members, who are chosen for a term of 3 years by the federal assembly (the national council and the council of states in joint session). They divide among themselves the 7 departments of foreign affairs, of the post and edifices, of justice and police, of finance, of war, of the interior, and of commerce and duties, each member taking one department and being at the same time the substitute in a second department. The president and vice-president of the council are chosen for one year only. The federal court, which is also chosen by the federal assembly for a term of 3 years, consists of 11 members. Bern is the federal capital. The 3 national languages are German, French, and Italian. The constitution may at any time undergo a revision in the regular way of legislation; if the two councils disagree, or if 50,000 citizens demand it, the question of a revision has to be submitted to a direct vote of the people. The revised constitution, in order to become effective, must be adopted by a majority of all citizens of Switzerland as well as by a majority of the cantons. The cantonal constitutions may be divided into two classes: 1. Pure democracies, in which the rights of sovereignty are exercised by a general assembly of all citizens, which meets once a year, mostly in April or May, votes upon laws, fixes the taxes, and elects the cantonal officers. The executive is called *Landrath*, and consists of the cantonal officers and the councillors (*Rathsherren*) elected by the several political communities. This is the constitution of Uri, Appenzell, Unterwalden, and Glarus. 2. Representative democracies, in which the people elect a legislative assembly, called the grand council, which chooses from its own number the executive, called little council. In many cantons the people have the right of vetoing every bill passed by the grand council. In most of the cantons the members of the grand council receive no pay. Instead of printed law books, some of the smaller cantons used until recently written traditions; the practice is however now disappearing, and nearly every canton has its printed code of laws. Many old Germanic elements are to be found in Swiss law; the Roman law has had a predominating influence only in a few border cantons. The institution of the jury, which was first tried in Geneva, has since been introduced into Vaud, Bern, Zürich, and several other cantons.—The finances of Switzerland are in a very favorable condition. Only a few cantons have a public debt, and some, as Zürich and Bern, possess a large public property. The taxes are nowhere heavy, and in some cantons there are no direct taxes. The federal debt incurred by the war of the Sonderbund has already been liquidated. The budget for 1860 was as follows:

RECEIPTS.

	Fr.	Cts.	Fr.	Cts.
I.—Receipts from real estate and capital....			318,169	89
II.—Interest on advanced capital and subsidies....			105,482	62
III.—Monopolies and administration:				
1. Duties....	7,765,925	55		
2. Posts....	6,916,911	56		
3. Telegraphs....	433,286	20		
4. Powder....	1,175,412	69		
5. Percussion caps....	50,033	60		
6. Coinage....	4,584,607	98		
7. Polytechnic school....	25,198	81	21,133,163	23
IV.—Receipts of the chancery and reimbursement:				
1. Chancery....	8,484	50		
2. Military department....	115,441	53		
3. Justice....	4,875	00	128,801	03
Total....			21,685,566	27

EXPENDITURES.

	Fr.	Cts.	Fr.	Cts.
I.—Interest....			354,567	29
II.—General expenses of administration:				
National council....	126,276	00		
Council of states....	5,890	00		
Federal council....	61,000	00		
Federal chancery....	151,187	17		
Federal court....	10,159	84		
Pensions....	28,722	61	383,185	62
III.—Departments:				
Political department....	156,146	40		
Interior....	239,925	87		
Military....	22,332	55		
Financial....	41,924	86		
Justice and police....	29,186	94	489,516	62
IV.—Special administrations:				
Military....	3,698,419	33		
Duties....	3,482,755	97		
Telegraphs....	439,856	77		
Powder....	1,174,042	54		
Percussion caps....	49,680	94		
Coinage....	4,584,607	98		
Telegraphs....	122,712	89		
Polytechnic school....	217,198	81	20,686,186	79
V.—Unforeseen....			310	00
Total....			21,913,766	32
Receipts....			21,685,566	27
Deficit (1860)....			228,200	05

—The military establishment of Switzerland is based upon purely democratic principles. Every able-bodied citizen is a defender of the republic, not on paper merely or by a legal and constitutional fiction, but actually. The federal army consists of citizens from 20 to 44 years of age, and is divided into 3 classes according to age. The first class, comprising men from 20 to 34 years of age, constitutes the active field army (*Auszug*); the second class, 34 to 40 years, the reserve army; and the third class, 40 to 44 years, the sedentary militia (*Landwehr*). The federal government provides for the instruction of the engineers, artillery, and cavalry, furnishes part of the material of war to the cantons, and superintends the quality of the material furnished by the cantons. The instruction of infantry soldiers requires 28 days, of riflemen 35 days. All the different classes are required to devote a certain number of days in each year to battalion and brigade drills and field manœuvres. The Swiss are known to be accurate marksmen with the rifle, and meet constantly to practise and engage in trials of skill. There are clubs and societies in almost every valley and parish, and constant matches between them; beside which a federal rifle match is held every year, at which all the best shots from the whole of Switzerland meet to contend for a prize. Annual contests in wrestling (*Schwingfeste*) also are held in different parts of Switzerland, especially in Bern, Appenzell, and Unterwalden. In Dec. 1860, the field army numbered 81,257 men, the reserve army 43,284, and the militia 61,878; total, 186,419.—The first inhabitants of Switzerland are supposed to have been of Celtic origin, and to have immigrated into the country from the N. E. Their collective name was Helvetians. The high valleys near the sources of the Rhine, in the present canton of Grisons, were occupied by a tribe akin to the Tyrrhenians or Etruscans, called the Rhætians. In 113 B. C. two tribes of Helvetians, the Tigurini and Tugeni (from which are derived the names of Zürich and Zug), joined the Cimbri and Teutons in their inroads into Italy. In this war the Helvetian Divico, in 107, completely routed the Romans under their consul L. Cassius Longinus. After the defeat of the Cimbri in 101, the Helvetians returned unmolested to their mountains, followed, it is believed, by the scattered remnants of the Cimbri, to whom the foundation of the town of Schwytz is ascribed. In the time of Cæsar an entire tribe of the Helvetians, instigated by their leader Orgetorix, determined to conquer seats in Gaul, destroyed their towns and villages, and under the command of Divico crossed the Saône; but they were conquered by Cæsar at Bibracte (Autun), and driven back to their country. Soon afterward the Helvetian tribes were gradually subdued by the Romans, and even the Rhætians, who were the last to maintain their freedom, were compelled at length to yield. For several centuries Switzerland remained a province of the Romans, who introduced their manners, laws, and civilization, and founded several towns, as Augusta Rauracorum (Augst, near Basel), Vindonissa (Windisch, in Aargau), Aventicum (Avenches, in Vaud), and Eburodunum (Yverdun). In the 2d, 3d, and 4th centuries the country was often harassed by the invasion of German tribes, especially the Alemanni; the Celtic and the Roman elements of the population mostly perished, the towns were sacked, and the country laid waste. In the 5th century the Burgundians, Alemanni, and Goths divided the country among themselves; but the dominion exercised by them was of short duration, and they were all in the 6th century brought into subjection by the Franks. Christianity, which had already begun to take root in Burgundian Switzerland, became under the rule of the Franks the religion of the entire country. Many bishoprics and convents were founded, and the bishops and many abbots, as those of St. Gall, Einsiedeln, &c., obtained great political influence. Though wholly incorporated with the empire of the Franks, the country was in point of administration divided into two parts; the one, extending from the lake of Constance and the Rhine to the Aar and St. Gothard, was called Rhætia and Thurigau; and the other, comprising Geneva, Valais, Neufchâtel, Bern, Freyburg, Soleure, &c., was called Little Burgundia. Under the weak reign of Charles the Fat, Switzerland, like many other parts of the empire, was lost to the Franks. The N. part came into the possession of the duke of Alemannia (Swabia), and thus became part of the German empire, while the S. part belonged to Burgundy. During the invasion of Germany by the Hungarians, many towns, as St. Gall, Basel, Zürich, and Lucerne, were fortified, and thus rose in importance. During the reign of the emperors of the house of Saxony the country was mostly held as fiefs by the vassals of the empire, in particular by the bishops and abbots, the counts of Kyburg (Zürich), Hapsburg (Aargau), Lenzburg (Aargau), Rapperswyl (St. Gall), and Toggenburg (St. Gall); later also by the count of Savoy and the duke of Zähringen. Many of these noble families became extinct during the crusades; and the power and prosperity of the towns rose still higher, Bern and Freyburg even becoming free cities of the German empire. Zürich, Bern, and Basel formed an alliance, and tried to make themselves independent. Yet the independence of Switzerland did not proceed from them, but from the three ancient cantons of Schwytz, Uri, and Unterwalden, the inhabitants of which are believed to have descended from immigrants from Sweden, and which had never been conquered. They were only under the protection of the German emperor, near whom their rights were guarded by a *vogt*, first a count of Lenzburg, and afterward a count of Hapsburg. The elevation of Rudolph of Hapsburg to the imperial throne of Germany in 1273, and his conquest of Austria and other possessions of Ottocar of Bohemia, greatly increased the influence of the house of Hapsburg in Switzerland. The son of Rudolph, Albert, sought to incorporate the Swiss with Austria. Bern and Zürich at once resisted successfully; but in the 3 old cantons of Schwytz, Uri, and

Unterwalden he succeeded for a time. The convention entered into by 33 distinguished men of the 3 cantons on the Rütli, a meadow on their common frontier, Nov. 1, 1307, led, on Jan. 1, 1308, to the expulsion of the Austrian officers and the destruction of their castles. The legend of Tell belongs to this period. The relation of the 3 cantons to the German empire remained at first unchanged; but the war of Austria for reëstablishing its rule in the emancipated cantons, which lasted with many interruptions for about 200 years, ended with severing also the ties which bound Switzerland to Germany. The Hapsburgs also lost their possessions lying between the Alps and the Rhine, and their old family castles of Hapsburg and Kyburg. The league of the 3 old cantons, which had first been formed in 1291 and renewed in 1308, was again sworn to and established as a perpetual confederacy in 1315, after the great victory over the Austrians at Morgarten on the confines of Schwytz and Zug. In 1332 Lucerne joined the confederacy, which received the name of the Four Forest Cantons. Zürich came in in 1351, Glarus and Zug in 1352, and Bern in 1353, when the 8 united cantons erected the "perpetual league of the 8 old places of the confederacy," so called because no new members were added to the confederacy until 1481, and these 8 old ones enjoyed many privileges until 1798. Other brilliant victories over Austria were gained at Sempach (Lucerne), July 9, 1386, and at Näfels (Glarus), April 9, 1389; after which the Swiss became aggressive in their policy, and at length, notwithstanding their defeats at Arbedo (Ticino) in 1422 and at St. Jacob (Basel) in 1444, annexed a considerable portion of Austrian territory. These protracted wars awakened such a fondness for warfare that many Swiss soldiers, not finding sufficient military occupation at home, entered foreign armies, where, until a very recent period, they earned the questionable reputation of being the most loyal defenders of the cause they had once espoused, even if it were that of despotism. There were sometimes also internal dissensions, and Zürich from 1440 to 1450 seceded from the confederacy. As at this time the canton of Schwytz had a predominant influence in the councils of the confederacy, its cantonal colors (white and red) were adopted as the confederate ensign, and the party name Swiss (Schwytz) became the designation of the entire people. A great war against Charles of Burgundy, the most powerful prince of his times in W. Europe, was gloriously terminated, after brilliant victories had been gained by the Swiss at Granson (Vaud) and Morat (Freyburg) in 1476, and at Nancy in 1477. The admission of Soleure and Freyburg into the confederacy in 1481 almost became the occasion of a civil war, which was however averted by the exhortations of a pious hermit, Nicholas von der Flue. Other internal dissensions were terminated by a war against the German emperor (1498), in which the Swiss showed their usual bravery. The emperor was obliged to conclude in 1499 the peace of Basel, and Basel and Schaffhausen, in recompense for faithful assistance, were admitted as members of the confederacy, to which in 1513 Appenzell was also added. The number of cantons thus rose to 13, and remained so until 1798. The Swiss conquered Lombardy for Duke Maximilian Sforza in 1512, and routed the French at Novara in 1513, but in 1515 lost the great battle at Marignano; nevertheless they found France willing to conclude with them an advantageous peace in 1516, which was kept until 1798. The reformation of the 16th century rent the country into two hostile camps. Among its leaders were Zwingli in Zürich, Œcolampadius in Basel, Haller and Manuel in Bern, Farel and Calvin in Geneva. In most of the cantons the reformation was introduced, but Lucerne, Uri, Schwytz, Unterwalden, and Zug formed a league for the defence of the old faith. Several wars ensued, in one of which Zwingli lost his life (1531) in the battle at Cappel (Zürich), in which the Roman Catholics were victorious. Soon afterward peace was concluded, and every canton left at liberty to introduce or to oppose the reformation. Geneva freed itself, with the aid of Bern, from Savoy, and became in 1536 a Protestant republic, without however being admitted into the confederacy. Vaud was also conquered by Bern from Savoy in 1553 and reformed; but on the other hand, the Catholic cantons of Lucerne, Uri, Schwytz, Unterwalden, Soleure, and Freyburg formed in 1586, by the advice of Archbishop Charles Borromeo of Milan, the "golden league" for the common defence of the Catholic religion. The religious split long continued a prolific source of dissension between the cantons. In 1597 the canton of Appenzell, in order to prevent a religious war, was separated into two independent half cantons, the Catholic part being called Inner Rhodes, and the Reformed Outer Rhodes. In 1602 the Reformed were expelled from Valais, and in 1620 Protestantism was forcibly suppressed in Valtellina. In Grisons a bloody civil war was kindled, in which other cantons also took part, and which made the country one of the chief seats of the war between France, Spain, and Austria. As the federal courts of Germany still continued to make claims on Switzerland as belonging to the German empire, the Swiss sent the burgomaster Weltstein of Basel as their representative to the peace congress of Münster, which at the peace of Westphalia (1648) pronounced Switzerland entirely independent of Germany. From this time until the outbreak of the French revolution in 1789, the history of Switzerland presents few events of general importance. It had no foreign war, and the religious contests at home, which still occurred from time to time, were mostly of short duration. The most important of them was the second war of Toggenburg in 1712, when 150,000 Swiss were in arms against each other. Other internal commotions arose out of the oligarchic form of government which was gradually established in the cantons of Bern, Freyburg, Soleure, and Lucerne, and out of the oppressed condition of the subjected territories whose inhabitants were excluded from all political rights. In 1798 two French armies marched, without any respectable pretext, into Swiss territory, captured on March 5 the city of Bern, plundered its armory and treasury, and on April 12, 1798, proclaimed at Aarau the one and indivisible Helvetic republic, divided into 18 cantons, with Aarau as the federal capital. By the new constitution Bern was divided into 4 cantons, the subjected districts of Baden, Thurgau, Lugano, and Bellinzona (Ticino) erected into cantons, Zug, Uri, Schwytz, and Unterwalden united into the one canton of the Forest Towns, and Appenzell, St. Gall, and the valley of the Rhine formed into the canton of Sentis. Geneva, Bienne (Bern), and several other portions of Swiss territory were incorporated with the French republic. The resistance of the old forest cantons proved useless, and the new constitution was gradually introduced, though but little liked. Overthrown on the entrance and advance of the allied armies under the command of Suwaroff, it was reëstablished after the victories of the French under Masséna. The withdrawal of the French troops in 1802 led at once to revolutions in almost every canton, and a general diet, consisting of an equal number of deputies from the formerly governing and the governed districts, was convoked at Schwytz; but again France interfered, 12,000 French troops subdued the old cantons, and deputies from all the cantons were ordered by Bonaparte to assemble at Paris for the purpose of reorganizing Switzerland. On Feb. 19, 1803, Bonaparte transmitted to them the act of mediation, by which the former cantonal system was restored, although the relation of subjected territories remained abolished. To the 13 old cantons 6 new ones were added, viz.: St. Gall and Grisons, which had formerly been allied with the confederacy without being members, and Aargau, Thurgau, Ticino, and Vaud, which had been subjected territories. At the head of the confederacy was again placed a diet (*Tagsatzung*), consisting of commissioners, voting according to instructions. It was to assemble in turn in the cities of Bern, Zürich, Lucerne, Basel, Freyburg, and Soleure, and the burgomaster of the *Vorort* or temporary capital, under the name of *Landammann* of Switzerland, was to preside at the diet and to attend to all the current affairs of the year. In the democratic cantons the sovereign popular assemblies were reëstablished; in the others grand and little councils, the former being elected by a direct vote of the people, and the latter by the grand council. This new constitution was on the whole well received, and under it Switzerland for 10 years enjoyed peace at home and abroad. After the battle of Leipsic the troops of the allied powers marched through Switzerland. Bern and others of the aristocratic cantons severed their connection with the Helvetic government instituted by the act of mediation, and civil broils ensued in a number of cantons. Yet the attempt to restore the former order of things had soon to be given up, and a new constitution, adopted by the federal diet on May 27, 1815, sworn to at Zürich on Aug. 7, and ratified by the great powers of Europe on Dec. 20, acknowledged all the 19 cantons constituted by the act of mediation, and added 3 new ones, Geneva, Valais, and the Prussian principality of Neufchâtel. The territory of Switzerland was enlarged by portions of land ceded by France (the Dappes valley), Savoy (Carouge and several villages on the lake of Geneva and on the Rhône), and Austria (Razuns, the Frickthal, Laufenburg, and Rheinfelden). The cantons of Soleure, Grisons, Schwytz, and Appenzell Inner Rhodes adopted the constitution only with reluctance, and Nidwalden (one half of Unterwalden) had to be coerced into submission by force of arms. According to the new confederation the cantons guaranteed to each other their constitution, and united for the common defence of their independence. The diet was to assemble annually on June 1, alternately at Bern, Lucerne, and Zürich, and to it was reserved the right of declaring war, concluding peace, and forming alliances with foreign powers. The cantons retained, however, the right of forming with foreign states special military agreements. The existence of the convents and cathedral chapters was guaranteed by a special article. The administration of federal affairs, during the time that the diet was not in session, was left to the *Vorort*. In 1817 Switzerland, upon the invitation of the emperor Alexander of Russia, joined the holy alliance, and from 1823 to 1828 it conceded to the urgent requests of the great powers of Europe a restriction of the liberty of the press and of the right of asylum. The aristocracy recovered in most cantons part of their former prerogatives, and several capital towns greatly enlarged their influence at the expense of the country people. The French revolution of July, 1830, led therefore to violent political agitations in Switzerland. In several cantons the country people rose against the capital towns, and forced them to reorganize the cantonal constitutions on a more liberal and democratic basis. In the canton of Basel a permanent division into two independent half cantons, Basel City and Basel Country, was effected in 1832. In Nov. 1832, some of the most conservative cantons, Uri, Schwytz, Unterwalden, Neufchâtel, and Basel City, formed the "league of Sarnen," and threatened to send no more commissioners to the federal diet if the commissioner from Basel Country were admitted. The federal diet interfered with promptness and energy; the separate league was declared dissolved, and the refractory cantons had to submit to the federal authority. Altogether, liberal cantonal reforms were introduced in about two thirds of Switzerland. Encouraged by this success, the progressive party conceived also the plan of revising the federal constitution, which seemed to be inadequate to satisfy the want of a closer political union. The diet, on July 17, 1832, pronounced in favor of the revision; yet, when the amendments adopted by the diet were subjected to a direct popular vote, they were voted down by a coalition of the Catholic and the radical parties. The large number of political refugees, who gathered in Switzerland in consequence of the revolutionary movements of 1830, involved the country in serious difficulties with the great powers, which complained of the liberty granted to them by the federal diet. The latter endeavored to conciliate the powers by several resolutions restricting the liberty of the refugees (in 1834 and 1838), and even by the expulsion of some of the leading men among them (1836); yet the diplomatic collisions continued. The demand of the French government, in 1838, for the expulsion of Louis Napoleon, who had been since 1832 a citizen of the canton of Thurgau, was declined by Switzerland, and almost led to a war, which was only avoided by his voluntary departure. An occasion for new religious contests was given by the conference at Baden in 1834, at which delegates of the canton of Bern, Basel Country, Aargau, Thurgau, Lucerne, Soleure, and St. Gall (the first 4 of which are predominantly Protestant), undertook to regulate the relations of the Roman Catholic church in a manner which was rejected by the pope and the bishop of Basel as contrary to the rights and the spirit of the church. The articles of the conference provoked several insurrections, especially in the canton of Aargau, the government of which, in order to punish the revolted Catholic districts, decreed in 1841 the abolition of all the convents. Against this measure most of the Catholic cantons and the ambassador of Austria protested, as a direct violation of that article of the constitution of 1815 which guaranteed the continuance of convents and chapters. Upon the representations of the federal diet Aargau offered to restore 3 female convents, a concession which did not satisfy Austria and the Catholic cantons, but the federal diet by 12½ votes dismissed the subject from its docket (Aug. 31, 1843). A cause of still greater trouble was a motion, made by Aargau at the diet of 1844, for the expulsion of the Jesuits from Switzerland. It was laid on the table by the diet; but when the Catholic *Vorort* Lucerne resolved (Oct. 24, 1844) to call the Jesuits to a cantonal institution, a great excitement spread throughout Switzerland. Two volunteer expeditions (Dec. 1844, and March, 1845) were undertaken for the purpose of overthrowing the government of Lucerne, but both were unsuccessful. On the other hand, the governments of Vaud, Bern, and Zürich, which had voted against the expulsion, had to give way to others which were in favor of the project. As thus the danger threatening the existence of the schools of the Jesuits increased, the cantons which either had called Jesuits to cantonal institutions, or which patronized them (viz., Lucerne, Uri, Schwytz, Unterwalden, Zug, Freyburg, and Valais), strengthened a separate alliance (the "Sonderbund"), which had already been formed in 1843, and appointed a council of war for the emergency of a civil contest. A motion of Zürich at the diet of 1845 to declare the Sonderbund dissolved received only 10½ votes, but a change of government of Geneva and St. Gall secured for the motion a majority of 12½ votes on July 20, 1846. One Protestant canton (Neufchâtel), one Protestant half canton (Basel City), and one Catholic half canton (Appenzell Inner Rhodes) voted with the cantons of the Sonderbund. In September another resolution declared the expulsion of the Jesuits from all Switzerland. The diet collected an army of nearly 100,000 men under the command of Gen. Dufour, and on Nov. 4 resolved to execute the decree of July 20 by force of arms. The Sonderbund had raised a force of 36,000, which was to be supported by a *Landsturm* of 47,000 men. The war, contrary to expectation, was of short duration. The isolated Freyburg was first attacked, and surrendered after an insignificant skirmish. On Nov. 23 the army of the Sonderbund was routed at Gislicon, near the frontier of the canton of Lucerne; the council of war, the government of Lucerne, and the Jesuits fled, and all the 7 cantons submitted. Austria, France, and Prussia had openly declared during the war their sympathy with the Sonderbund, and in 1848 issued a joint note to Switzerland, demanding that the cantons of the Sonderbund be evacuated, and no change be made in the constitution of 1815, except by the consent of all the cantons. But the revolutions of 1848 drew off the attention of the great powers from Switzerland, and gave the latter an opportunity to hasten a thorough reformation of the federal constitution. The committee of revision commenced its labors on Feb. 17, 1848, and on June 27 the draft of the constitution which is at present in force was submitted to a direct vote of the people. A majority of the cantons and a large majority of the total population voting in favor of it, it was promulgated Sept. 12. In the same year the canton of Neufchâtel declared itself independent of Prussia, which entered against this act an inefficient protest. The success of the counter revolution in 1849 again brought thousands of political refugees to Switzerland, and again, owing to the demands of the great powers, they were made the subject of restrictive and unfavorable legislation, which soon reduced their number to a few hundreds. The expulsion of some Capuchin monks, who were natives of Lombardy, from the canton of Ticino, and the participation of some Italian refugees who had been living in Switzerland in a revolutionary attempt at Milan in 1853, led to a suspension of diplomatic intercourse with Austria; but the matter was peaceably settled on March 18, 1855. On Sept. 2 the royalists of the canton of Neufchâtel made an attempt to overthrow the government of the canton and to reëstablish the sovereignty of the king of Prussia. The movement was at once suppressed (Sept. 3), but led to serious complications with Prussia, which demanded the unconditional pardon of the captured royalists. The demand was supported more or less by all the great powers of Europe; and when the federal council refused to accede to it, Prussia broke off diplomatic relations, and made some warlike demonstrations. When, however, France and England promised their intercession with Prussia in behalf of a recognition of the independence of Neufchâtel, in case Switzerland would release the royalist prisoners, their advice was followed by the federal council. Prussia was now found willing to enter into negotiations, and on April 14, 1857, at a conference of the great powers at Paris, resigned for ever its claims to Neufchâtel. In 1860 Switzerland protested against the annexation of Savoy to France, as a violation of the treaties of 1564 and 1816, by which the neutrality of the districts of Chablais and Faucigny had been guaranteed. It demanded from France the cession of these two districts, but as it was little aided by the great powers, its representations were of no effect.—The principal works on the geography and history of Switzerland are: Sulz, *Topographisches Lexikon der Schweiz* (3 vols., Aarau, 1827); Franscini, *Neue Statistik der Schweiz* (2 vols., Bern, 1849; appendix, 1851); Johannes von Müller, *Geschichte der Eidgenossenschaft*, with continuations by Glutz-Blotzheim, Hottinger, Vulliemin, and Monnard (13 vols., Leipsic, 1806–'51); Zschokke, *Geschichte des Schweizerlandes* (Zürich, 1822); and Meyer von Knonau, *Handbuch der Geschichte der Schweizerischen Eidgenossenschaft* (2 vols., Zürich, 1826–'9).

SWORD, a weapon used in hand encounters, commonly made like a large knife, and sometimes pointed like a dagger. The ancient Egyptians possessed the art of imparting to bronze extraordinary hardness and elasticity, and employed this material for swords and daggers. Wilkinson describes the former as straight and short, from $2\frac{1}{2}$ to 3 feet in length, having generally a double edge and tapering to a sharp point. Four ancient bronze swords are preserved in the British museum, one of which, supposed to be Etruscan, is about 18 inches long, and is bound round the handle with gold wire. The blades of the others are from 10 to 25 inches long, $1\frac{1}{2}$ to 2 inches wide, and are adapted for cutting and thrusting. The allusions to swords are very frequent in the poems of Homer. The Greeks had several names for the several varieties, and they are spoken of as having silver handles and being studded with silver. They too were of bronze, but at a later period of iron; and as seen upon coins, vases, &c., they appear to be short cut-and-thrust blades, tapering from hilt to point and provided with a scabbard, which was attached on the left side to a belt suspended from the shoulder or round the waist. The Romans in the time of Polybius had sword blades of finely tempered steel prepared by the Celtiberians. They were short and straight, made for cutting and thrusting, and were worn on the right side. Those of the gladiators were curved. The most famous swords were the Damascus blades of the middle ages, described in the histories of the crusades, and by Scott in the "Talisman." The steel was probably the East Indian wootz, and the manufactured articles were fabricated on the shores of the Mediterranean. (See Damascus Blades.) Next to these the swords of Toledo in Spain attained great celebrity in the time of the Moors. Though attempts were made to remove the manufacture to Seville, the same processes that were employed at Toledo here failed to produce the same sort of steel; and for want of a better explanation of the cause of the failure, it was attributed to some peculiar excellence in the waters of the Tagus in which those of the Gaudalquivir were lacking. Milan also was famous for its excellent swords during the middle ages. The introduction of gunpowder rendered swords of secondary importance. In the 17th century those made by the Germans were in good repute, and about the year 1689 unsuccessful efforts were made to establish the manufacture with the aid of German workmen in Cumberland, England, and the adjacent counties. It was not, however, until 1786 that good blades were made in that country. At that time Mr. Gill, of Birmingham, competing with German and English makers for supplying the East India company, produced a large number which bore the required test of bending till the length of the blade was reduced from 36 to $29\frac{1}{2}$ inches; and it is stated that they were so keen, tough, and elastic, that Mr. Gill would cut a gun barrel asunder with them, and then wind the blade round it like a ribbon, after which the blade would spring back, and recover its original straightness except at the point. Swords are still made at Toledo of as good quality as ever, but the manufacture employs only 70 or 80 hands.—The best of cast steel is required for good swords. The bars are hammered down by two men striking alternately; and if the blade is to have concave sides or other peculiarities of shape, these are obtained from the dies in which it is swaged. When shaped, it is hardened by heating in the fire to dull red and dipping point downward in a tub of cold water. It is tempered by drawing it through the fire until it acquires a blue color, and is then set or straightened by springing it with the tongs in any required direction as it is held in a sort of fork standing in the anvil. After this it is ground upon a stone with a face adapted to that of the sword, flat or otherwise; is slightly heated to restore the temper impaired by grinding; and is finally polished with emery and crocus.—The small sword used in fencing is a slender weapon for the thrust only, and is the court dress sword. The broad sword, called sometimes the back sword, has but one edge. The heavy two-handed sword, of great length and breadth, made by the Spaniards, is called an *espadon*. A sword cane is a hollow walking stick, containing a concealed dagger attached to its handle. A sword bayonet is a sword blade fitted like a bayonet to the musket.

SWORD FISH, the very appropriate name of the *xiphiidæ*, a family of marine spiny-rayed fishes, allied to the mackerels, so called from the prolongation of the snout into a long, horizontally flattened, sword-like weapon. The sword consists of the vomer and intermaxillary bones, supported at the base by the frontals, nasal, and upper jaw. In form this fish resembles the mackerel; the scales are very small; the jaws proper, and sometimes the sword, are crowded with small, acute teeth, often hardly perceptible; the laminæ of each branchial arch are united into a band-like organ, with only superficial marks of separation, as in no other bony fishes; branchiostegal rays in the typical genus *xiphias* (Linn.) 7. The spinous dorsal begins near the head, high and sickle-shaped, extending nearly to the tail, and followed by a small soft fin; the anal is similar but much shorter; ventrals wanting, or represented only by a pair of spinous rays on the throat; caudal deeply forked, on the sides having 1 or 2 large cutaneous folds; the pyloric appendages are collected into bundles and connected by areolar tissue, the branches forming 2 trunks inserted into the intestine close to the pylorus; the stomach cæcal and conical, and the air bladder large; the lower jaw in the young is proportionally longer than in the adult; the sclerotic forms a bony box, with a circular opening in front for the cornea, rendering the eyes very movable in their orbits. They are very swift swimmers, and feed on mackerel and other fishes collecting in shoals. The common sword fish (*X. gladius*, Linn.) attains a length of 12 to 20 feet, and is found in the Mediterranean and on both sides of the Atlantic; it is strong and active, using its sword to destroy its enemies, and sometimes striking at vessels, burying its weapon deep in their timbers; in these cases Cuvier thinks it is irritated by parasitic crustaceans which bury themselves in its flesh; or perhaps it mistakes the passing object for a whale, to which it seems to have a special enmity. There are no ventral fins, and the sword is about $\frac{3}{10}$ as long as the body. It occurs on the North American coast from Nova Scotia to New York, being common in the summer in Vineyard sound and between No Man's Land and Block island; it is silvery white below, and tinged above with blackish blue, the sword dark brown above and lighter below. It is fond of pursuing the shoals of mackerel, and may be detected by the dorsal fin projecting above the water. On the American coast, and also in the Mediterranean, the chase of the sword fish resembles whaling in miniature, and is very exciting; a man aloft gives notice of a fish being near, when the fishermen row toward it, and strike it with a harpoon made for the purpose; by attaching a floating cask to each harpoon, several fish may be struck in a few hours, and each individual separately taken in by following the cask; there is sometimes danger of a small boat being upset or pulled under water by a large fish, which may struggle to escape for hours, and now and then boats are pierced and their occupants severely wounded by the sword of the infuriated animal; some fishermen prefer to take them singly, harpooning them from the bows of a large vessel, and hauling them in at once. The flesh is esteemed as food, both fresh and salted, and in some summers forms a considerable article of commerce with the Vineyard fishermen.—Several species of other genera are found in tropical seas.

SYBARIS, an ancient Greek city of Lucania, in S. Italy, situated on the W. shore of the Tarentine gulf, between the rivers Crathis (now Crati) and Sybaris (Coscile), a short distance from the sea. It was founded by an Achæan colony about 720 B. C. Settlers of other nations were freely admitted to all the rights of citizenship, and a vast population was thus acquired; and through the fertility of the country in which it was situated, the city rose rapidly to great wealth and power. At the time of its greatest prosperity, about 200 years after its foundation, it is stated by Strabo that the city itself occupied a space of 50 stadia in circumference, ruled over 25 subject cities, and could send into the field an army of 300,000 men. It founded Posidonia, Laüs, and Scidrus, and carried on an extensive trade, especially with Miletus in Asia Minor. Sybaris was famous throughout the ancient world for the effeminate habits and love of luxury of its citizens. The arts which contributed to the luxurious enjoyment of life were there most highly prized, and it is stated by Athenæus that no craft was permitted in the city which made a noise that might disturb the citizens. The government was entirely in the hands of the aristocracy until about 500 B. C., when Telys, an aristocrat, headed a democratic party, drove out the wealthier citizens and rulers, and raised himself to the position of tyrant. Five hundred of the exiled nobles took refuge at Crotona, and Telys sent thither to demand their surrender. This was refused, and a war ensued in which a large army of Sybarites was beaten by one third the number of the Crotoniatæ, who followed up their victory by the sack of Sybaris, and turned the course of the river Crathis so that the city was inundated and buried in the deposits that the river brought down. Sybaris was never restored; its site is now a malarious marsh, and its exact position cannot be determined. Its surviving inhabitants, after remaining for many years at Laüs and Scidrus founded near it, with Athenian colonists, the city of Thurii.

SYCAMORE, a name usually applied in the United States to the *platanus occidentalis* (Mx.) or buttonwood tree (see Plane Tree), and in Europe to a species of maple (*acer pseudoplatanus*, Linn.), of which there are several distinct and beautiful varieties known. (See Maple.) The sycamore of the Sacred Scriptures is a species of fig (*ficus sycamorus*, Linn.), a native of Egypt, where it becomes a considerable timber tree. Its branches spread out widely, affording a grateful shade, and the trees are therefore planted by the sea shore and by the road sides. As it becomes old much of its picturesque beauty vanishes, and its branches are crooked, broken, and leafless. The figs, which are sweet and delicate, are produced in clustered racemes on the trunks and limbs instead of the new shoots. Its timber has been reputed almost indestructible, but Forskähl says it is only fit for fuel.

SYDENHAM, Floyer, an English scholar and translator, born in 1710, died April 1, 1787, in prison, where he had been confined for a debt due the eating house where he dined. He was educated at Wadham college, Oxford. He translated the greater part of Plato's works, which were published between 1759 and 1780 in 3 vols. 4to. The translation in general is excellent, though in a few of the more abstruse passages he failed to express fully the tenets of his author. It was completed in 1804 by Thomas Taylor. He published also "A Dissertation on the Doctrine of Heraclitus" (1775), and *Onomasticon Theologicum* (1784). His sufferings from poverty in his old age, and his miserable death in prison, led to the foundation of the literary fund, which bestows small gratuities on poor and deserving authors.

SYDENHAM, Thomas, an English physician, born at Windford Eagle, Dorsetshire, in 1624, died in London, Dec. 29, 1689. He was educated at Magdalen hall, Oxford, and in 1648 obtained a fellowship in All Souls' college, and remained there some years pursuing his studies, visiting France in the mean while and attending the lectures of Barbeyrac. About 1660 he went to Westminster, and soon obtained a large practice and great reputation. Abandoning the routine system then in vogue, he based his practice on principles which have exerted a great influence on the profession from that time to this; these principles are, that nature cures diseases; that there is in the human system a recuperative power, which he named the *vis medicatrix naturæ*, and that this should be aided, not thwarted; and that the symptoms of disease are the language of a suffering and endangered organism, for which the physician should prescribe. He was the first physician who treated small pox with cooling remedies, or intermittent fever with cinchona. His letters and tracts on particular diseases are valuable for the accuracy of their observation. The preparation known as Sydenham's laudanum was one of many valuable additions which he made to the materia medica. His largest work, *Observationes Medicæ circa Morborum Acutorum Historiam et Curationem* (London, 1675), was translated 3 times into English and passed through 25 editions in 100 years. It is still regarded as a valuable work.—In 1843 a society, composed mainly of members of the medical profession, was founded in London under the name of the Sydenham society, having for its object the republication of the works of Sydenham and of other eminent physicians of former times, otherwise inaccessible to professional readers in general.

SYDNEY, a town upon the S. E. coast of Australia, capital of the colony of New South Wales, and residence of the governor-general of Australia. It is situated on the S. side of the estuary or extensive harbor of Port Jackson, about 7 m. W. S. W. from the sea, in lat. 33° 52′ S., long. 151° 14′ E.; pop., including the suburbs, about 120,000. Part of the town stands upon a promontory, with Darling harbor on the W.; part of it occupies a narrow valley to the E. of this; and the remainder is built upon undulating ground extending S. and still further E., with extensive water frontage to the N. and N. E. Since the discovery of gold in Australia Sydney has advanced very rapidly, and the suburbs of Wooloomooloo, Paddington and Surrey Hills, Redfern and Chippendale, Camperdown, Newtown, and the Glebe are now almost connected with Sydney proper by continuous lines of well built houses; while Balmain and the North Shore have numerous steam ferries, and Pyrmont has lately been joined to the city by a bridge across Darling harbor. The town, whether viewed from the harbor or the adjoining heights, has a very imposing appearance; and the surrounding shores and innumerable bays and rocky promontories of Port Jackson present scenery not to be surpassed in any part of the world. Sydney stands upon a sandstone formation, and this material has been extensively used both in public and private buildings. The streets are generally well laid out, intersecting each other at right angles, and 34 of them have carriage ways not less than 36 feet, and foot ways not less than 12 feet wide. The city is well supplied with water, and the streets lighted with gas. Sydney contains numerous churches, and is the residence of a bishop of the church of England and a Roman Catholic archbishop. It has a university, established in 1850, the degrees of which confer the same rank as those of similar institutions in England. The merchants' exchange, custom house, court house, museum, legislative and executive council chambers, public library, public markets, benevolent asylum, and hospitals are all worthy of notice. The government house is a very handsome structure, beautifully situated among well wooded grounds overlooking the harbor. There are societies for the promotion of the fine arts, floral, horticultural, and agricultural societies, a botanical garden, several parks, and a domain. A branch of the royal mint was established here in 1855, the coin of which is a legal tender in all the Australian colonies, Mauritius, Ceylon, and Hong Kong.—The harbor is completely landlocked, and vessels of the largest size can come close to the wharfs, which extend along its shores. In 1858 the shipping inward amounted to 348,984 tons, and outward to 366,825 tons. The value of the imports for the same year was £6,058,366, and of the exports £4,186,277. This apparent excess of imports over exports is caused by the exportation of gold coin, of which no account can be taken at the custom house, and also by the large numbers of cattle, horses, and sheep driven across the frontier to Victoria. The chief exports consist of wool, gold, tallow, hides, gums, &c. The corporation revenues for 1858 amounted to £55,451, and the expenditures to £66,862. Considerable efforts have been made of late years to fortify Port Jackson; several batteries occupy commanding positions, and when the projected defences are completed it will be a place of great strength.

SYDNEY, or SIDNEY, a seaport town of Nova Scotia, capital of the county and island of Cape Breton, in lat. 46° 7′ N., long. 60° 9′ W., about 200 m. N. E. from Halifax; pop. about 1,000. It is well situated at the head of a safe and commodious harbor, with a good lighthouse at the S. side of its entrance. The importance of the place is principally derived from the extensive coal fields that exist in the neighborhood. The thickness of the bed worked at the Sydney mines is 6 feet, and another at a few miles distance has a seam of 9 feet. The coal from the Sydney mine is conveyed to the wharf by railroad, and during the year ending Sept. 1857, 92,270 tons were exported.

SYENE. See ASSWAN.

SYENITE. See GRANITE.

SYLLA, or SULLA, LUCIUS CORNELIUS (FELIX), a Roman statesman and soldier, born in 138 B. C., died in 78. His family, the original name of which was Rufinus, belonged to the great Cornelia *gens*, one of the noblest of the patrician *gentes*, of the Sabine branch of the early Romans, called Titienses; but his inheritance was small, and in his youth he lived in a house which was in part occupied by a freedman. He however was a diligent student of the literature of his own country, and of that of Greece; and he early indulged that taste for profligate pleasures which characterized his whole life. One of his mistresses bequeathed to him all her property, and to this was added the property of his stepmother, who made him her heir; and thus he became, though not rich according to the Roman estimate of wealth in those days, possessed of means to enter on the career of ambition. He was elected quæstor for the year 107, and was appointed to take over to Africa the cavalry sent to Marius. As the new officer's reputation was for profligacy only, the consul was displeased with the appointment; but Sylla's conduct soon won the confidence of his chief and the regards of the soldiers, with whom he lived on the most familiar terms. Sylla, says Sallust, "when he came into Africa and to the camp of Marius with his cavalry, though he had been before unskilled and ignorant in the art of war, became in a short time the ablest of all. Beside, he used to accost the men with much urbanity, and granted favors to many at their own request, to others of his own accord, but was very unwilling himself to receive any, but those he did he repaid with much more haste than a debt, while he himself never demanded any return from others, but rather was desirous that as many as possible should be his debtors. He would joke or be serious with the humblest, and was very often seen in the encampments, in the march, and amid the watches; nor did he in the mean time, as is the custom of bad ambition, lessen the character of the consul or any worthy man. He only would not suffer any one to be before him in counsel or action, and excelled most. By which behavior and practice he became very dear to Marius and the soldiers." His part in the battle of Cirta, in which Jugurtha and Bocchus were defeated, was a prominent one; and when Bocchus betrayed Jugurtha to the Romans, Sylla was the principal actor on the side of the latter in the negotiations. In the wars that were waged against the Cimbri and Teutones, Marius being consul, Sylla had command as one of his legates, and then as military tribune, distinguishing himself in both stations. The good understanding which had so long existed between them came to an end, however, and Sylla served under Q. Catulus, the other consul, to the increase of his reputation and of the enmity of Marius. For some years Sylla remained a private citizen, but sought the prætorship in 94, without success. The next year he was chosen to that post; and in 92 he was sent as proprætor to Cilicia, with directions to restore Ariobarzanes to the throne of Cappadocia, from which he had been driven by the king of Pontus. This duty he discharged, and with success so brilliant that the king of the Parthians sent ambassadors to him, asking an alliance with the Romans. This was the first official intercourse between Rome and the Parthians. On his return to Rome, Sylla became the head of the aristocratical party, as his enemy Marius was the chief man among the leaders of the other faction; and both aspired to the command against Mithridates. The breaking out of the social war postponed that appeal to arms which both were anxious to make. In that contest Sylla was much more successful than Marius, winning several victories, capturing towns, and reducing the Samnites, as well as others of the enemies of the Roman supremacy. He allowed great license to the soldiers, and attached them to his person. He was chosen consul for the year 88, and the senate assigned to him command of the army in the East; but Marius placed himself at the head of the Italian party, and Sylla was driven from Rome. Hastening to the army that was besieging Nola, he easily prevailed upon it to obey his commands, and marched to Rome, of which he took possession, the Marians being unable to resist him. After restoring the former state of things, he led his army to Greece, of which the troops of Mithridates had taken possession. He besieged Athens, which was stormed March 1, 86, and plundered it. Piræus then fell into his hands; and he followed the enemy into Bœotia, inflicting a crushing defeat upon them at Chæronea. A new army sent by Mithridates was defeated at Orchomenus. Sylla then crossed the Hellespont, and in 84 he granted peace to the Pontine monarch. He also defeated the Roman general Fimbria, who commanded the army sent by the Marians to the East. Having extorted large sums of money from the Asiatic cities, and leaving two legions in Asia, he led the rest of his army back to Greece to prepare for the war in Italy, where the Marian party had regained ascendency. He landed at Brundusium in the spring of 83. The senate sought to reconcile the chiefs of the two parties, but a treaty was impossible. Marius was dead, and Cinna, the ablest of his lieutenants, was murdered by his own soldiers; so that, though the Marians had an enormous force in the field, and were supported by the Italians, or new citizens, they had no military chief who could act against the conqueror of Mithridates. Sylla conciliated the Italians, making treaties with many of their towns, and promising to maintain them in the possession of their privileges. Partly by victories in the field and partly by intrigues, he dispersed or gained over both the consular armies that were opposed to him. He was now joined by several influential Romans, among whom were Crassus, Metellus Pius, and the youthful Pompey, the latter bringing with him 3 legions. In 82 Sylla defeated the younger Marius, who was one of the consuls for that year, and shut him up in Præneste. He then proceeded to Rome, and came very near meeting with total defeat at its gates; for Pontius Telesinus, the chief man among the Samnites, with whom the Lucanians were united, resolved to march direct upon the city, in order, as he said, to destroy the wolves of Italy in their den. The Samnite hate of the Romans had survived two centuries of subjugation, and Telesinus sought to accomplish that which his ancestors had failed to effect before the Roman arms had achieved any thing out of Italy. The Samnites had not received the new franchise, and they were animated by the most vindictive feeling toward the Romans. Failing to effect the relief of Præneste, which was besieged by Ofella, Telesinus proceeded to Rome, which was defenceless, and reached the city but a short time before Sylla also arrived at its gates. The battle that followed was one of the greatest ever fought. Sylla commanded the left wing of his army, which was routed and driven from the field; but the right wing, under Crassus, was victorious, and retrieved the battle. The number of men who fell on both sides was 100,000. The Samnites and Lucanians who were captured were all put to death, and Præneste surrendered, young Marius having committed suicide on seeing the head of Telesinus. In a short time the greater part of the Roman world submitted to the victor, the only man who continued to resist his rule being Sertorius, who carried on the war in Spain until his own death, and for several years after the death of Sylla. The aristocratical leader took the severest vengeance on his enemies, and Italy was the scene of a reign of terror. He introduced the proscriptions, which were lists of his enemies that were exhibited in the forum, and all persons were authorized to kill any one whose name could there be found. To gratify his adherents, he placed in these lists the names of their enemies, or those of persons whose property they desired to seize. He caused himself to be appointed dictator, thus reviving an office that had been unknown to the Romans for 120 years; but while he was dictator he was elected consul. No one of the Cæsars was ever more powerful than was Sylla during his dictatorship, supported as he was by an enormous army, by a large number of slaves whom he had enfranchised (they had belonged to persons who had figured in the proscriptions), by the military colonies he had established throughout Italy, and by the influence which had been created by his successes, his energy, and his cruelty. During his dictatorship a large number of laws were adopted tending to concentrate the power of the state in the aristocracy. He took from the assemblies of the tribes their legislative and judicial power, and also the right to elect priests. No matter was allowed to be brought before the centuries without the previous sanction of a *senatus consultum*. He filled up the senate, and placed the government of the provinces entirely in its hands; and renewed the old laws with regard to magistrates, requiring a regular gradation from office to office, and that no one should be reëlected to the same office till after the expiration of 10 years. The number of quæstors was increased from 8 to 20; of prætors from 6 to 8. He reduced the power of the plebeian tribunes to a mere shadow of what it had been, and forbade all tribunes from aspiring to the higher curule offices. The right of self-election was restored to the ecclesiastical corporations, and the number of pontiffs, augurs, and keepers of the sibylline books was increased to 15 respectively. The aristocracy regained the privilege of having judges taken exclusively from the senatorian order, of which they had been deprived by Caius Gracchus. He reformed the criminal law, enacted sumptuary laws, and sought to regulate marriages. Few of his measures long survived him. "Sylla's enactments," says Mr. G. Long, "were not, like the imperial constitutions of a later day, the mere act of one who held the sovereign power; they were laws (*leges*) duly passed by the popular assembly. Yet they were Sylla's work, and the legislative body merely gave them formal sanction. The object of Sylla's constitutional measures was to give an aristocratical character to the Roman constitution, to restore it to something of its pristine state, and to weaken the popular party by curtailing the power of the tribunes." As soon as he had completed his legislation, Sylla resigned his dictatorship (79 B. C.), and gave to the people an account of his conduct as a public officer. He had none of that ambition which afterward led Cæsar to found the imperial power; but it may be doubted if he could have performed the part that Cæsar played, had he been inclined to take it. He valued the pleasures of sense and of letters as much as he did those of power, and, feeling secure in the strength of the system he had set up, he devoted the remainder of his days to personal indulgence, residing at Puteoli. He suffered from the horrible disease known as the *morbus pediculosus;* but it has been said that this is one of the calumnies of his enemies, that his illness was only a fever, and that his death was immediately occasioned by the bursting of a blood vessel. At the time of his triumph, in 81, he took the surname of Felix, because he attributed his success to the gods; and when he had to do with Greeks, he called himself Epaphroditus. Venus he claimed as his especial patroness, who had given him success both in love and in war. He was 5 times married, and his last wife, Valeria, gave birth to a daughter after his death. He wrote memoirs, in 22 books, the last of which was completed but two days before his death, and with his full knowledge that his end was near. He dictated his own epitaph, which says, in substance, that "none of his friends ever did him a kindness, and none of his enemies ever did him a wrong, without being fully repaid." "Sylla," says Mr. Long, "was an educated man; he was not a mere soldier like Marius. He was not only a general; he was a man of letters, a lover of the arts, a keen discriminator of men and times, a legislator, and a statesman. He remodelled and reformed the whole criminal law of the Romans. His constitutional measures were not permanent, but it may truly be said that he prepared the way for the temporary usurpation of Cæsar, and the permanent establishment of the Roman state under Augustus."

SYLLOGISM. See Logic.

SYLVA, Bueno da. See Bueno da Sylva.

SYMBOLS, Chemical, abbreviations for expressing the chemical composition of bodies. The idea of representing the names of chemical substances by conventional signs or abbreviations appears to be a very old one. The alchemists were in possession of a set of hieroglyphics by which the metals, and the four so called elements, fire, air, earth, and water, and indeed many other substances, were designated. At a later period, as chemical knowledge became more consolidated, various modifications of the alchemistical notation were from time to time proposed, and adopted to a greater or less extent. Among these should be specially mentioned the system of notation offered in 1787 by Hassenfratz and Adet, as an appendix to Guyton de Morveau's revised system of nomenclature, since its failure enables us the better to appreciate the peculiar excellence of the system which now prevails. Here was a system of symbols by no means devoid of ingenuity, and much more complete than any previous method, published in connection with a new system of nomenclature, which was soon universally adopted, and recommended by the committee of the French academy by whom this nomenclature had been prepared; yet it met with little or no favor among chemists, and was soon forgotten. This last remark applies as well to the symbols proposed by Dalton in 1808, in connection with his writings upon the atomic theory. None of these systems ever came into general use, nor does it appear that they were of much value as instruments of study even in the special cases in which they were employed. It is to Berzelius that chemical science is indebted for the simple and rational system of notation now in use, which has done so much, especially of late years, to advance knowledge and to lighten the labors of chemical investigators. This system, in its first outlines at least, appears not to have been the result of any premeditated plan or special study, but to have followed incidentally as a natural result from the investigation of the combining proportions of bodies with which its author was occupied. Thus in 1814 he first mentions his symbols in a foot note to a memoir upon nitrous acid (Gilbert's *Annalen der Physik*, xlvi. 154), as convenient abbreviations for expressing the composition of bodies, which he has himself frequently employed in his private memoranda. Subsequently a more complete exposition of the plan appeared in his *Lehrbuch*, and in Poggendorff's *Annalen*, 1826, viii. 7. As a sign to express the name and combining equivalent of an element, Berzelius chose the initial letter of its Latin name; and in those cases where the names of several elements commence with the same letter, he annexed to the common initial the first of the following letters in the Latin name of the element which is peculiar to it; thus, the symbol C indicates an equivalent of carbon, Cl an equivalent of chlorine, and Cr an equivalent of chromium. (For a complete list of these symbols, see Equivalent, Chemical.) The symbols of binary compounds are formed by placing together the symbols of their components, CoO for example representing an equivalent of oxide of cobalt, from Co (cobalt) and O (oxygen); those of ternaries (salts) by uniting the symbols of their component binaries, a comma being placed between these, as CdO, SO_3, sulphate of cadmium; and those of quaternaries (double salts) on the same principle, a semicolon or the sign + being placed between the binaries of which they are formed, as CdO, SO_3; $MgO, SO_3 + 6HO$, hydrated sulphate of cadmium and magnesia; the sign + is commonly used to indicate a component which is less essential to the existence of the compound than the other ingredients, it being possible in the cited case to remove the water without destroying the compound CdO, SO_3; MgO, SO_3. This supposed subordinate part of the water of crystallization of salts is often denoted by putting the symbol Aq (*aqua*) in place of HO. When it is desired to represent more than one equivalent of a substance, figures in large type may be placed before, *i. e.*, to the left of it, or in small type to the right or after it, just below the line upon which the symbol itself is placed. A figure on the left hand multiplies all the symbols to the right of it as far as the first comma, or indeed the whole formula when this is enclosed in brackets, while a small figure to the right multiplies only the letter, or bracketed formula, immediately to the left of it; thus NH_3 (ammonia) denotes an equivalent of a compound containing 1N (nitrogen) and 3H (hydrogen); Fe_2O_3 denotes one equivalent of sesquioxide of iron, and $2Fe_2O_3$ two equivalents of the same base.—In constructing formulas, it is also convenient to preserve a definite arrangement of the letters and members. In the spoken names of chemical substances, as oxide of iron, chloride of potassium, &c., we first express the term which denotes the acid or electro-negative component; but in the written symbols the reverse of this is customary, the symbol of the basic or positive element being placed first, *i. e.*, at the left hand, as FeO, KCl, &c. So too with the names of salts, the formula of sulphate of potash being written KO, SO_3, not SO_3, KO. The reason of this order is that the symbols express not English but Latin words, and the construction of the Latin language requires that the genitive must precede the nominative that governs it.—Formulas are called rational when their several members are grouped so that they shall express either what some have supposed to be the actual arrangement of the components of the body which they represent, or in some conventional manner by which the relation which exists between the composition and properties of the body and its behavior toward other substances may be called to mind; and empirical formulas are those in which only the elements present and the number of equivalents of each are noted, without any definite arrangement being given to the list. Thus, $Fe_2O_3, 3SO_3$ is one way of writing a rational formula of tersulphate of iron, while $Fe_2S_3O_{12}$ is its empirical formula.—The system of collocation of symbols and formulas thus far described, which is that of the so called dualistic school of chemists, and the one of which the public at large has most cognizance, is employed only upon a portion of chemical substances. Although exceedingly convenient in certain cases, and sufficiently complete for most purposes of elementary instruction, it would be quite impracticable to employ it in the study of very complex substances, for which other and various arrangements of the symbols are consequently brought into use. Even for the most common and simple cases chemists have proposed methods of arrangement different from the one just mentioned. Thus Davy in his so called binary theory proposed to write K, SO_4 instead of KO, SO_3 for sulphate of potash, &c.; and others, objecting entirely to the theory of dualism, have suggested the idea of giving special prominence to the empirical formula of a substance, which in their view expresses all our positive knowledge of its composition, leaving it to every one to theorize upon this as he may please. It is precisely in affording facilities for speculating upon and comparing the composition of compounds, and for presenting one's hypotheses to others, that the immense importance of chemical symbols chiefly lies; and this not only from the direct influence which they exert in leading to new discoveries, but also indirectly in tending to prevent abrupt changes and infinite confusion in the spoken nomenclature, which would otherwise inevitably occur. For example, so long as Davy had the means of expressing his view of the constitution of sulphate of potash by writing the formula K, SO_4, he had but slight incentive to introduce a new name for this substance. The nomenclature is thus kept within limits, ill defined though they be, which render it far more useful than if it were allowed to vacillate and expand indefinitely. Berzelius's original idea was to employ his symbols and formulas merely as convenient substitutes for the names of substances, and this at an epoch when the name was thought to express even the molecular constitution of a compound, or the actual arrangement of its component atoms—a view which has since been very materially modified. It is now felt to be in many cases not only unnecessary and impossible, but often undesirable, to force the symbolic and the spoken nomenclatures into agreement with each other, however convenient such agreement may be in other instances, or even as the general rule. In many cases, where it would be impossible in practice to express an idea of the rational constitution of a substance by any combination of names, a single glance at its written formula is sufficient to convey this idea; and in others several different rational formulas may with equal propriety be assigned to one and the same substance, in which case the body may indeed also have several names, of which each might be better adapted than any of the others to express its composition in some one special instance; but as a rule, when a spoken name has once come into general use, it is not easy to substitute another for it, although the formula of the body may be changed as often as may be found convenient. In spite of all this, much confusion has no doubt arisen from the multiplication of spoken names; but when compared with what might have been but for the use of symbols and formulas this is hardly deserving of mention.—Many chemists, claiming that in the existing state of science it is impossible that formulas can be made to express any thing more than the relations and analogies which bodies bear to each other, and that consequently those formulas must be the best which are capable of exhibiting the largest number of these relations and analogies, now make no effort to represent the actual arrangement of the atoms of chemical compounds, but seek only to designate the elements or groups which, in the double decompositions by which compounds are formed or destroyed, replace or are replaced by other elements or groups of elements. In order to do this, it has been found convenient to throw all substances into a few great classes of analogues, the leading member or type of each of these divisions being some familiar and well characterized compound, and to derive the formula of each and every member of a given class from the formula of its own peculiar type or pattern. Thus water, $\left.\begin{matrix}H\\H\end{matrix}\right\}O_2$, might be taken as a type to which all other compounds may be referred, but the use of several types has been found more convenient. Gerhardt in his *Traité* refers to 4 types, viz., water, $\left.\begin{matrix}H\\H\end{matrix}\right\}O_2$; ammonia, $N\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$; hydrogen, $\left.\begin{matrix}H\\H\end{matrix}\right\}$; and chlorhydric acid, $\left.\begin{matrix}H\\Cl\end{matrix}\right\}$. In many cases, however, a multiple of one or the other of these types is the true typical formula, as $\left.\begin{matrix}H_2\\H_2\end{matrix}\right\}O_4$, $\left.\begin{matrix}H_3\\H_3\end{matrix}\right\}O_6$, &c. Other chemists, and perhaps these are still the majority, believing that the doctrine of duality contains an element of truth which should not be discarded, seek to preserve this by adhering to the prevailing method of writing formulas, though all admit its imperfections.—Carrying out his original idea of abbreviations at a time when he was chiefly occupied with the study of compounds in mineral chemistry, and notably with those of oxygen and sulphur, Berzelius suggested that it might be convenient in special cases to make use of certain modifications of the symbols already described, where the object is merely to indicate the composition of a complex body without discussing its reactions and decompositions; for instance, the number of equivalents of oxygen in a compound was denoted by dots placed above the radical with which this element was supposed to be combined, and the equivalents of sulphur in like manner by commas or accents; and in cases where two atoms of the radical combine with 1, 3, or 5 atoms of oxygen or the like, this double atom of the radical was characterized by a dash drawn through the lower part of the letter which stands for the radical (as $\not{H} = H_2$); thus CuO, SO_3 would be written $\dot{Cu}\dddot{S}$, and $\dddot{\not{Fe}}\dddot{S}_3$ instead of $Fe_2O_3, 3SO_3$; $\acute{K}$ instead of KS; $\acute{K}\overset{\prime\prime\prime}{Mo}$ instead of KS, MoS_3. Of these modifications the dashed symbols alone have been at all generally accepted. The dots and accents have been much employed by mineralogists, but were little esteemed by the generality of chemists. Indeed, it is now customary to use the accent marks to express an entirely different idea, viz., to characterize polyatomic radicals; that is, compounds which, in uniting with or reacting upon other bodies, play the part not of one but of two or more atoms of a simple element, or, in the language of the chemists who refer all formulas to types, those radicals which replace more than one atom of hydrogen in the type water. Thus the normal chloride of ethylene, $C_4H_4Cl_2$, contains not only one but two atoms of chlorine, and cannot therefore be referred directly to the simple type HCl, but to the double of this, H_2Cl_2; and to denote that the compound C_4H_4 replaces 2H, *i. e.*, that it is a diatomic radical, it is customary to write it with a double accent, thus, $C_4\overset{\prime\prime}{H}_4$, and the formula of the compound in question $\left.\begin{matrix}C_4\overset{\prime\prime}{H}_4\\Cl_2\end{matrix}\right\}$. So, too, the formula of tartaric acid is written $\left.\begin{matrix}C_8H_4\overset{\prime\prime}{O}_8\\H_2\end{matrix}\right\}O_4$, and that of glycerine $\left.\begin{matrix}C_6\overset{\prime\prime\prime}{H}_5\\H_3\end{matrix}\right\}O_6$, which represent them as being derived from 2 and 3 atoms of water respectively by the substitution of the diatomic radical $C_8H_4O_8$ for 2 atoms of hydrogen in the one case, and of the triatomic radical C_6H_5 for 3 atoms of hydrogen in the other. In like manner, hydrated sesquioxide of iron would be written $\left.\begin{matrix}\overset{\prime\prime\prime}{Fe}_2\\H_3\end{matrix}\right\}O_6$ instead of $Fe_2O_3, 3HO$; Fe_2 being considered as a triatomic radical; so too quinoleine, $N\{C_{18}\overset{\prime\prime\prime}{H}_7$, in which the 3 atoms of H of the type ammonia are replaced by the triatomic radical $C_{18}H_7$; strychnine, $N_2\{C_{42}H_{22}O_4^{\mathrm{VI}}$, *i. e.*, the double type $N_2\left\{\begin{matrix}H_3\\H_3\end{matrix}\right.$, in which the 6 atoms of H have all been replaced by the hexatomic radical $C_{42}H_{22}O_4$.—Another abbreviation which has been proposed for the purpose of designating some organic compounds consists in employing the initial letter of the ordinary name of any of these, with one or more additional smaller letters when the first is not of itself characteristic, with a dash above if the compound is an acid or a + sign when it is an alkaloid; thus $\bar{O}$ stands for oxalic acid, $\bar{A}$ for acetic acid, $\overset{+}{Qu}$ for quinine, Cy for cyanogen, &c. These are still sometimes used in special cases, although they have but little to recommend and much to condemn them.—Very many methods of arranging formulas, beside those which have here been alluded to, are employed by different chemists to express their own peculiar theoretical notions of the composition of bodies, but a discussion of these special instances would here be misplaced. Many of these are sufficiently complex and difficult of comprehension; but in its essential features the system of notation employed by chemists is still the universal language which Berzelius provided in choosing his symbols from the Latin nomenclature.

SYMMACHUS, Quintus Aurelius, a Roman statesman and author, who flourished about the close of the 4th century. He was educated in Gaul, and, after being quæstor and prætor, was appointed in A. D. 365 corrector of Lucania and the Bruttii. In 373 he was proconsul of Africa, in 384 prefect of the city, and in 391 consul. He was a sincere pagan, and labored strenuously to maintain that declining faith. He was possessed of immense wealth, and his leisure hours were devoted to liberal studies. His extant works are 10 books of epistles containing 965 letters, and fragments of orations which Angelo Mai discovered in one of the palimpsests of the Ambrosian library, and others from a Turin and Vatican MS. The first edition of the epistles was published without date or name of place in the pontificate of Julius II. One of the best is that of Scioppius (4to., Mentz, 1608).

SYMMACHUS the Samaritan, a native of Samaria, who flourished about A. D. 200. He was at first of the Samaritan religion, then became a Jew, and then a Christian of the sect of the Ebionites. He made the 4th Greek translation of the Old Testament, which occupied the 4th column of Origen's *Hexapla*, but of which only a few fragments now exist, collected by Montfaucon.

SYMMES, John Cleves, an American soldier and projector, born in New Jersey about 1780, died at Hamilton, Butler co., Ohio, May 28, 1829. He entered the army as ensign in 1802, and in the war of 1812 fought with great gallantry at Lundy's Lane and the sortie from Fort Erie. Subsequently he settled at Newport, Ky., and devoted himself to researches connected with a favorite theory invented by him, according to which the earth is hollow, open at the poles, and capable of being inhabited within. He wrote and lectured much on this subject, and in 1822 and 1823 petitioned congress for means to fit out an expedition to test the truth of his theories. He made a few converts, but his suggestions were generally treated with open ridicule or silent contempt, the author being considered little better than a lunatic. He died in considerable pecuniary embarrassment, much respected for his integrity.

SYMPATHETIC INK. See Ink, vol. ix. p. 530.

SYMPHONY (Gr. συν, with, and φωνη, voice), a term originally signifying merely a concordance of tones, but applied successively to certain vocal compositions, to compositions partly vocal and partly instrumental, to short introductory or intermediate instrumental passages in compositions which are predominantly vocal, and finally to elaborate and extended compositions in which instruments only are employed. The germ of the modern symphony may be found in the *Concerti grossi* of Corelli, and in the works of Geminiani and Vivaldi, produced in the early part of the 18th century; but previous to the time of Haydn the composition in its present form was unknown. The last named composer divided it into 4 or 5 parts, performed successively, and developing distinct ideas, but having a general relation. In the structure of the symphony the parts are generally made to contrast with each other, a slow or andante movement being succeeded by an allegro or quick one, and this by an andante again or an adagio, after which comes a minuet and trio, or a scherzo, the whole concluding with a rapid finale. The chief composers of this form of music are Haydn, Mozart, Beethoven, Spohr, and Mendelssohn, the greatest being Beethoven. The 9th or "Choral Symphony" of this master differs from works of its class in introducing vocal music into the concluding movement.

SYMPLEGADES. See Argonauts.

SYNAGOGUE (Gr. συναγωγη, assembly, place of assembly; Heb. *beth hakkeneseth*, house of assembly), a building appropriated to worship and the performance of public religious rites in Jewish congregations. Corresponding to the word church in Christian terminology, the term is also applied to the Jewish community in general. The earliest synagogues, established in the times of Persian and Greek rule in Judæa, were destined also for deliberative purposes. (For the "great synagogue" see Hebrews, vol. ix. p. 37.) In subsequent centuries they were also used as seats of popular as well as higher instruction. In modern Jewish communities this is imparted in a separate building, called *beth hammidrash*, house of study. The synagogue is generally a high and plain building, facing the 4 cardinal points, and provided with seats and desks on the floor for the male members of the congregation, and with galleries for the females. The east wall, which all must face during the recital of certain prayers, encloses the "holy ark" (*aron hakkodesh*), in which Hebrew copies of the Pentateuch, written on vellum, are deposited; and opposite it, near the centre, is the platform (*bimah*) on which the reading from the same is performed by the reciter or cantor (*'hazan*), or by a special reader (*ba'al kore*). Sermons or lectures are delivered from a smaller platform adjoining the "holy ark," by the rabbi or a special preacher or lecturer. Frequently, however, the offices of reciter, reader, and lecturer are united in the same person.—Among the most celebrated synagogues in various periods are mentioned those of Alexandria, Bagdad, Toledo, and Prague.

SYNCOPE, a fainting fit or swoon. Syncope may occur from a large, and particularly from a sudden loss of blood; from a sudden impression made on the nervous system, as fright, horror, &c.; from the effect of a variety of poisons which influence the heart's action; or from inanition or debility, which weakens the muscular power of the heart along with that of the voluntary muscles. If the heart ceases completely to beat for any time, the individual dies; but in an ordinary fainting fit, as it is termed, the heart continues to beat, though so feebly and faintly that its beat may not be felt; still the ear applied directly over it will distinguish the sound made by its contraction. In such cases the patient should be placed in a horizontal position, with the head if possible a little lower than the body. Cold water may be dashed over the face and chest to excite the respiratory act. Ammonia may be held to the nostrils, and stimulants administered if possible by the mouth, if not by enema.

SYNDIC (Gr. *συνδικος*, from *συν*, with, and *δικη*, justice), an administrative officer in various cities or other communities, and in corporate bodies. At Athens any person appointed to represent the state in an affair in dispute with another state was called syndic. In Latin authors the word *syndicus* is used in the sense of attorney. In the middle ages the syndic represented a university, a church, or any corporate body at law, and transacted its general business. Syndic was the usual name for the town clerk in some parts of France. By Froissart the word syndic is used as a hereditary title of nobility in some cases where it had been only given originally as the title of an administrative officer. The merchants or others who composed the chambers of commerce established in France in 1701 were called *syndics du commerce*.

SYNESIUS, a Christian bishop, philosopher, and poet of the 5th century, born in Cyrene, Africa, probably in 379. The date of his death is unknown. His family was rich and noble, and boasted a line of ancestry reaching back to the Heraclides. He was a pupil at Alexandria of the celebrated Hypatia, afterward studied at Athens, and returning to Cyrene lived for a time in retirement, engaged in study. Famine having come upon Cyrene, Synesius was sent to Constantinople to solicit aid, and was successful. After 3 years' stay in the Byzantine capital, he returned to Cyrene, and soon afterward, under the influence of a Christian wife, renounced paganism. In 410, on the death of the bishop of Ptolemais (now Tolmeta), Synesius was chosen to the see, although he had not been baptized, was married, and held opinions concerning the preëxistence of souls, the eternity of the world, and the resurrection, which were not regarded in the church as orthodox. He accepted the post with reluctance, was baptized, and after 7 months of preparation entered upon his episcopal duties. Some instances are recorded of his firmness in prohibiting heresies; but his mind seems to have been more exercised by troubles in the state than by discords in the church. His works consist of epistles, treatises, and hymns. The best complete collection of them is that of Petavius, in Greek with a Latin translation, editions of which appeared at Paris in 1612, 1633, and 1640. A new and more critical edition was published by Krabinger (2 vols. 8vo., Berlin, 1851). Many editions of the hymns have been published with translations into various tongues. A French version first appeared in 1581, and new ones in 1836 and 1839.

SYNOD (Gr. *συνοδος*, meeting), in the ancient church, an assembly of bishops, in which controversial points of doctrine or discipline were decided. In the Roman Catholic church, 4 classes of synods are at present distinguished, diocesan, provincial, national, and œcumenical, the last of which is always, and the 2d and 3d are frequently, called councils. (See COUNCIL.) In the Greek church all these 4 classes of synods have fallen into desuetude, but there are "holy synods," or supreme ecclesiastical boards of administration, at St. Petersburg, Constantinople, and Athens. In the Episcopal church of Great Britain, the British colonies, and America, the provincial and diocesan synods are now either in full use or on the point of restoration; the church in America has also a general synod. In the Presbyterian churches the synod is an essential link in their constitution, and consists of delegates, clerical and lay, of several presbyteries. They also have national synods called general assemblies. With the Presbyterian the Lutheran, German Reformed, and Reformed Dutch churches in America agree, which are also divided into synods, and at certain intervals convene a general synod. (In the German Reformed church the formation of a general synod has been decided upon, but not yet effected.) In the churches of continental Europe, the synodical constitution has for a long time been either wholly abrogated or greatly curtailed by the territorial system, which places the government of the church wholly in the hands of the state officers, or by the consistorial system, which divides the administration of the church between ecclesiastical boards called consistories and appointed by the secular government, and synods elected by the congregations. But since the beginning of the 19th century there has been a general and increasing tendency in the churches to return to the synodical constitution; territorial divisions have been almost entirely abandoned, and the consistories are yielding up many of their functions to the restored synods. Austria and some of the smaller German states, as Oldenburg and Baden, have almost purely synodical constitutions; nearly all the other German states have a regular system of diocesan synods and general synods by the side of their consistories. The same is the case in Switzerland, France, Belgium, and Holland, in all of which countries free churches have been formed, which reject the interference of the states and of state boards in church affairs, while the state churches generally demand at least the restoration of the old synodical system by the side of the consistorial.

SYNONYMES (Gr. *συνωνυμος*, from *συν*, together with, and *ονομα*, a name), words of the same language which are the precise equivalents of each other. As there are perhaps no two words absolutely identical in meaning, the term is ordinarily applied to those which are of similar significance, and which are likely to be confounded from their general resemblance, but require to be distinguished by reason of special differences. The idiosyncrasies of individuals, or the local usage of districts, may give different shades of meaning to words that agree in the main. Speakers and writers, to avoid the unpleasant effect of repetition, are often obliged to introduce a great variety of terms to convey the same thought. Words, not distinguishable in definition, may be employed under different circumstances, many terms being restricted to poetical, religious, or secular purposes. Many words become nearly synonymous by figurative or metaphorical usage, though etymologically of different signification; thus, Snorro's Edda enumerates 150 synonymes for sword. Especially in composite languages synonymes are introduced from different sources, as, in English, trick, device, finesse, artifice, and stratagem, respectively from the Saxon, Italian, French, Latin, and Greek. Such words, though etymologically identical in meaning, are generally distinguished by usage; thus, sphere (Gr.) belongs rather to scientific and poetical, and globe (Lat.) to popular language; shepherd (Anglo-Sax.) retains its primary meaning of keeper of sheep, and pastor (Lat.) has only an ecclesiastical sense; love (Anglo-Sax.) and charity (Gr.) are interchanged in the New Testament, but now charity signifies only one particular manifestation of love; illegible (Lat.) is applied to handwriting, and unreadable (Anglo-Sax.) to subject matter. The same root is often developed into different but kindred words, as human and humane, gentle and genteel, property and propriety, piety and pity, triumph and trump (card), etiquette and ticket, ghostly and ghastly, cant and chant. De Quincey says that "all languages tend to clear themselves of synonymes as intellectual culture advances, the superfluous words being taken up and appropriated by new shades and combinations of thought evolved in the progress of society. And long before this appropriation is fixed and petrified into the acknowledged vocabulary of the language, an insensible *clinamen* prepares the way for it." Precise diverse meanings are fixed upon synonymes, as invention and discovery; and words indicative of insignificant distinctions disappear from the language, as has been the case with a large number of the technical terms of the chase. "Few languages," says Mr. G. P. Marsh, "are richer than English in approximate synonymes and conjugates; and it is much to be regretted that no competent scholar has yet devoted himself to the investigation of this branch of our philology. The little manual edited by Archbishop Whately, containing scarcely more than 400 words, is, as far as it goes, the most satisfactory treatise we have on the subject. Crabbe's 'Synonymes,' much used in this country, is valuable chiefly for its exemplifications; but the author's great ignorance of etymology has led him into many errors; and it cannot pretend to compare with the many excellent works on synonymy of the German, French, Danish, and other European languages."—The oldest extant treatise on synonymes is by Ammonius of Alexandria (about A. D. 389). None of the ancient Latin works on the subject have been preserved. The best modern treatises on Latin synonymes are by Ramshorn, Döderlein, Habicht, Schmalfeld, and Schultz; on German, by Eberhard, Maass, and Weigand; and on French, by Girard, Beauzée, Roubaud, Guizot, and Lafaye (2 vols., 1841-'57).

SYNTHESIS. See ANALYSIS.

SYPHAX, a Numidian prince, born about 249 B. C., died in 201. In 213 he was king of the Massæsylians, the westernmost tribe of the Numidians, and was at war with Carthage; and through this circumstance he became allied with the two Scipios, who materially contributed to his success against the Carthaginians. But Carthage formed a strong combination against him, and he was at length beaten by Hasdrubal and Masinissa, in a great battle in which 30,000 men are said to have fallen. Syphax fled to Mauritania and collected a new force, but was again defeated by Masinissa. He subsequently regained possession of his throne, apparently by treaty with the Carthaginians. In 206 Scipio once more endeavored to bring him into a Roman alliance; but Hasdrubal gave him in marriage his beautiful daughter Sophonisba, though she had previously been promised to Masinissa, and thus secured his adherence to Carthage. Upon the death of Gala, king of the Massylians, his son Masinissa, after a contest with rival claimants, had ascended the throne; but Syphax with Carthaginian aid wrested it from him and made him a fugitive. When Scipio landed in Africa in 204, Syphax joined the Carthaginians with an army of 50,000 foot and 10,000 horse. In the spring of 203 his camp was suddenly attacked at night by Scipio (with whom he had been long negotiating for peace), the straw huts of the soldiers were fired, and nearly the whole army perished in the conflagration or were put to the sword. Syphax assembled another army, joined Hasdrubal, and was again entirely defeated. His kingdom was now invaded by his old enemy Masinissa with Roman allies. He assembled a third army, met them as they approached his capital, was defeated, fell into the hands of the Romans, and was sent a prisoner to Scipio. By him he was sent to Rome, and upon the conqueror's return, according to Polybius, appeared in his triumphal procession; but according to Livy he died at Tibur a few days before.

SYRA, or SYROS, a Grecian island, included in the Cyclades, 20 m. N. W. from Paros; area, 65 sq. m.; pop. about 42,000. The outline of the island is very irregular, and the coasts are steep and rugged. The surface is intersected by hills and narrow valleys, and the soil is not very fertile in consequence of a deficient supply of water. The hills are mostly composed of mica slate, and the principal minerals are iron ore and an inferior kind of marble. The climate is cooler than that of the neighboring islands, and is considered particularly healthy. The chief productions are wheat, barley, cotton, wine, figs, and silk.—Syra, New Syros, or Hermopolis, the capital of the island and of the Greek prefecture of the Cyclades, is situated at the head of a bay on the E. coast, near the site of the ancient city; pop. about 30,000. It contains several churches, a gymnasium, a quarantine establishment, several good private schools, and a custom house. It is the seat of a Roman Catholic bishop, and of the Greek bishop of the Cyclades. The harbor is large and convenient, and is the centre of steam navigation in the archipelago. An active trade exists in silk, manufactured goods, and coffee; and ship building is carried on. During the war of independence, Syra, being under the protection of France, did not take part in the hostilities against Turkey, and it became an entrepot for the commerce of Greece and the neighboring islands.

SYRACUSE, a city and the capital of Onondaga co., N. Y., situated at the head of Onondaga lake on a creek bearing the same name, 148 m. W. by N. from Albany, 80 m. E. by S. from Rochester, and 35 m. S. S. E. from Oswego; pop. in 1850, 22,271; in 1860, 28,199. The greater portion of the city occupies a level tract at the head of the lake, and a ridge from 100 to 200 feet high extends through the eastern part. From its central location it is a favorite point for holding state conventions, and hence is styled the "city of conventions." It has ample streets, and is regularly laid out and substantially built. The value of dwellings in 1855 was $6,228,627. The state asylum for idiots is the most imposing structure, erected in 1855 at a cost of $86,000, just S. W. of the city limits, on land given by the people of Syracuse. The grounds embrace 18 acres, commanding a fine view of the entire city. The institution has proved highly successful; its average number of inmates is about 100. The other charitable institutions are the Syracuse home association and the Onondaga county orphan asylum. The court house, built of Onondaga limestone at a cost of $40,000, is one of the finest edifices of its kind in the state. The state arsenal is a handsome building surrounded by a beautiful parade ground. The city hall and other public buildings are substantial structures. The city has 28 churches, viz.: 2 Baptist, 1 Congregational, 3 Episcopal, 4 Methodist Episcopal, 1 German Methodist, 1 Wesleyan Methodist, 2 Jewish synagogues, 2 Lutheran, 3 Presbyterian, 1 Reformed Dutch, 4 Roman Catholic, 1 Unitarian, and 3 of other denominations. There are 3 daily and 7 weekly newspapers. The city has 13 public schools, with a classical department or high school; and in 1860 the average attendance of pupils was 2,977, and the amount of money expended was $30,745.05. The district libraries number 5,181 volumes, and there is a central library in the city hall for the use of the schools, containing 4,000 volumes. There are also 2 seminaries, a classical school, a commercial college, and a boarding school for boys. There are 11 banks of issue and deposit, 2 savings banks, and a number of private banking offices. The city is supplied with water by a company. It is on the line of the Erie canal and of the New York central railroad; and the Oswego canal, Oswego and Syracuse railroad, and Syracuse, Binghamton, and New York railroad terminate here. The commerce and travel are unusually large for an interior city.—Syracuse is the depot of the greatest salt-producing region in the Union. (See Salt, vol. xiv. p. 305.) The principal manufactories are 3 furnaces, producing articles to the value of $100,000 annually; 7 machine shops, producing $313,000, and employing 320 hands; 3 silver ware manufactories, $47,000; 7 tin and sheet iron factories, $66,000; 9 breweries, over $400,000; 2 chandleries and soap factories, $42,000; 1 gas factory, $20,294; 1 boat yard, employing 50 hands; 3 gypsum bakeries, $13,000; 2 sash and blind factories, $35,785; 6 coach and wagon factories, $55,950; 1 wheelbarrow factory, $20,000; 3 grist and flouring mills, $368,275; 1 box factory, $30,000; 12 cooper shops, $49,120; 1 planing mill, $63,880; 2 saw mills, $37,500; 2 stone cutting establishments, $18,500; 1 water lime establishment, $6,000; 7 boot and shoe factories, $148,200; 6 saddle and harness shops, $31,500; 1 saddle and coach hardware manufactory, $57,120; 1 tannery, $30,000; 5 cabinet shops, $117,100; 4 hat and cap factories, $32,800; 5 tobacco and cigar manufactories, $150,000; a piano factory, 9 printing offices, and various other manufactories. The machine shops of the central railroad at this place employ about 150 hands, and as many more are engaged as conductors, brakemen, and track hands.—The first settlement was made in 1787. It was a small village until the completion of the Erie canal in 1825, since which it has rapidly increased. In 1847 it was incorporated as a city.

SYRACUSE (anc. *Syracusæ;* Ital. *Siracusa* or *Siragosa*), a city of Sicily, on the E. coast, 30 m. S. S. E. from Catania, and 81 m. S. S. W. from Messina; pop. about 16,000. It is fortified, and maintains a garrison, but is commanded by the heights of Achradina. It is the see of a bishop, and has a fine cathedral, 185 feet long and 75 wide, anciently the temple of Minerva; numerous palaces, and several churches, convents, and other public buildings. The streets are narrow, and there are extensive ruins of the amphitheatres, baths, &c., of the ancient city, some of them in good preservation. The city has some trade in wine, oil, brandy, fruits, salt, saltpetre, sulphur, and a little grain.—The ancient Syracusæ was the largest city of Sicily; its walls, flanked by towers, were 22 m. in circuit, and the number of inhabitants in its most prosperous period is stated by different writers at 500,000, 900,000, and even 1,200,000. It really consisted of 5 towns adjoining each other, but separated by walls, viz., Ortygia, Achradina, Tyche, Neapolis, and the Epipolæ, and hence was sometimes called Pentapolis. The original city was Ortygia, built upon an island of an oblong shape about 2 m. in circuit, situated between the Great or Greek harbor on the W. and the Little harbor on the E.; it was after a time connected with the mainland by a causeway, and was then spoken of as Ortygia on the peninsula. Achradina, which was next in age, was situated on the other side of the Little harbor, and extended along the sea coast for about 3 m. E. to the port of Trogilus, which was without the limits of the city; it was built partly on the lowlands along the shore, and partly on the heights which rise in a wall of rocks some little distance inland. North of Achradina and on the same range of heights stood Tyche, separated from it only by a double wall and a highway between; it extended northward about 2 m., and at its W. extremity, commanding Ortygia, were several heights named the Epipolæ, which were enclosed by Dionysius the Elder and formed one vast fortress. S. W. of Tyche, and opposite Ortygia, on the lowlands and extending to the wall of Achradina, at the foot of the heights, was Neapolis or the new town. On the W. of Ortygia, around the shores of the Great harbor as far as to the rocky peninsula of Plemmyrium, were suburbs and gardens occupied by the overflowing population of the city. After the Roman conquest, as the city declined in wealth and population, its limits became more restricted; at the time of Augustus it occupied only Ortygia and the lower part of Achradina, and since its capture by the Saracens it has been confined to the Ortygian peninsula. The heights of Achradina now present only a surface of rock, the ancient buildings and the soil having been alike removed. The sea has undermined the shore, the walls have disappeared, and over the elevated and extensive plain only steps hewn in the rock or a few courses of stone give evidence of the vast population which once inhabited it. On the peninsula and the lowland portion of Achradina and Neapolis, evidences of the former greatness of Syracuse are more abundant. Near the borders of Tyche, Achradina, and Neapolis, is the ancient theatre hewn out of the rock and now much overgrown with bushes; it contained 66 ranges of seats, all cut in the rock, and could accommodate 40,000 spectators. Not far from this are the ruins of an amphitheatre of the Roman period. Nearer to Ortygia are the ruins of the palace of Agathocles, and on the peninsula are traces of several other palaces. The *lautumiæ* or *latomiæ*, originally quarries cut in the wall of rocks which formed the face of the heights of Achradina, and excavated to the depth of 60 to 80 feet, are still perfect. Some of them were used as prisons; in one the Athenian prisoners were confined on the surrender of Nicias, and most of them perished. Near the site of the ancient theatre, on one side of the quarry, is that remarkable prison cut in the rock, now called the "ear of Dionysius." There are also catacombs of great extent containing subterranean streets of tombs, in which Greek and Roman, Christian and Saracen, have all found burial. The remains of a great aqueduct begun by Gelon and improved by Hiero also exist. Near the left bank of the Anapus, outside the walls and S. W. of the city, are the ruins of the temple of Jupiter Olympius. The celebrated fountain of Arethusa, now used, it is said, as a public bath, still exists as a large pool in the peninsula; a wall separates it from the sea. There are also remains of several baths, one of them with a spiral staircase. In the museum of the modern city are preserved statues, vases, coins, and inscriptions gathered from the ruins.—Syracuse was founded by Archias, the son of Euagetes, a Corinthian exile, who with a band of Corinthians and Dorians settled in the island of Ortygia in 734 B.C. Within 70 years from its establishment it had begun to send out colonies, among which were Acræ (664), Casmenæ (about 644), and Camarina (599). In 485 B.C., the Gamori, the ruling oligarchy, having been expelled, Gelon, the despot of Gela, undertook their cause, and not only effected their restoration, but made himself master of the city, to which he removed, and which, by transferring thither the inhabitants of Gela and several other cities, he greatly enlarged, and brought to a high state of prosperity. At his death in 478, Hiero, an able though somewhat despotic monarch, succeeded to the throne, and by his patronage of literature made it the favorite resort of the Greek poets and dramatists of the time, including Æschylus, Pindar, Bacchylides, Epicharmus, and Sophron. His brother Thrasybulus succeeded him in 467, but his tyranny and violence disgusted the Syracusans, and after a reign of a year he was expelled and a popular government instituted. In the autumn of 415 the Athenians, as allies of the Segestans, then at war with Syracuse, landed a hostile force in the Great harbor near its walls, and in the spring of 414 commenced a regular siege of the city; but the citizens, under Gylippus, resisted the besiegers so skilfully that at the end of a year their entire remaining force of 7,000 men, with their commanders Nicias and Demosthenes, were taken prisoners. (See GREECE, vol. viii. p. 447.) In 410 the Carthaginians commenced their aggressions upon Syracuse, and in 405 Dionysius the Elder, taking advantage of the apparently impending danger, made himself despot of the city, and, concluding a peace with the Carthaginians, ruled vigorously but tyrannically for 38 years. During his reign the city was so strongly fortified as to become impregnable to the repeated assaults of the Carthaginians. He was succeeded in 367 by his son Dionysius the Younger, whose tyranny and debauchery brought about his expulsion by Dion in 359; he regained his power in 346, but was finally expelled by Timoleon in 343. The restoration of liberty to Syracuse by the latter was followed by unexampled though brief prosperity; and 27 years later Agathocles acquired despotic power over the city, and used it for 28 years to plunge her in new and destructive wars. After his death (289) a short respite was had, but soon new tyrants assumed the sway, till in 270 Hiero II. obtained supreme power, and maintained a firm and judicious administration, greatly to the benefit of Syracuse, for nearly 60 years. In 263 he made a treaty with Rome, whose steadfast ally he thenceforward became. During his reign Syracuse attained to its highest splendor and magnificence. With his death (216), however, a great change took place. His grandson and successor Hieronymus abandoned the alliance of Rome for that of Carthage, and after his death the Carthaginians brought about an open rupture with Rome, which led to the siege of Syracuse by Marcellus (214–212), a siege rendered illustrious by the patriotic efforts of Archimedes for its defence, but which finally resulted in its capture and plunder. It then declined into an ordinary Roman provincial town, its population diminished, and it was only of importance as the capital of Sicily and the seat of a proconsular court. It continued to retrograde in wealth and population, and in 38 B. C. and the succeeding years was so plundered and despoiled by Sextus Pompey that Augustus sent thither a Roman colony to strengthen it. It was probably at this time that the Roman amphitheatre was erected. In the 4th century, though much decayed, it was still one of the largest cities of Sicily. It fell into the hands of the Goths at the overthrow of the western empire, but was recaptured by Belisarius in A. D. 535, and remained a fief of the Byzantine emperors till 878, when, after repeated attacks for 50 years and a siege of 9 months, it fell into the hands of the Saracens, who, exasperated at the obstinacy of its defence, massacred its inhabitants, destroyed its fortifications, and burned the city. From this terrible blow it has never recovered. It was partially rebuilt and fortified by Charles V., but in 1693 and again in 1757 was nearly destroyed by earthquakes.

SYRIA (Arab. *Esh-Sham*, the Aram of the Scriptures), a territory of Asiatic Turkey, bounded N. by Adana and Marash, N. E. by the Euphrates, E. and S. by Al Jezira and Arabia, and W. by the Mediterranean, between lat. 31° and 37° 35′ N., and long. 34° and 38° 45′ E.; area, 144,433 sq. m.; pop. 2,750,000. It is divided into the pashalics of Aleppo or Haleb, Tripoli or Tarabloos, Acre or Akka, Gaza, and Damascus, named from their respective capitals. The only important indentation on the coast is the large gulf of Iskenderoon or Scanderoon at the extreme N.; there are several small bays, as those of Acre, Tripoli, Beyrout, and Saida. The principal rivers are the Jordan, the Asi or Aasy (the ancient Orontes), the Litany (Leontes), the Kishon, the Yarmuk (Hieromax), the Burada (Abana), and the Awaj (Pharpar). The Euphrates drains the N. E. border. The only lakes of importance are the Dead sea and the lake of Tiberias or Gennesareth. The Taurus range forms a part of the N. boundary, and separates Syria from Asia Minor. The two parallel chains which extend through Syria from N. to S., the Libanus or Lebanon and the Anti-Libanus, are offsets from that range, forming low hills, and rising again to the snow line as they approach the Sinaitic peninsula. The W. or Lebanon chain runs parallel to the coast, and seldom more than 12 m. distant from it, to the plain of Esdraelon below Mt. Tabor; it is broken by the passage of the Orontes and the Leontes. Its highest summit ("at the entering in of Hamath") is more than 10,000 feet above the sea, and on its side are the remnant of the ancient "cedars of Lebanon." Separated from this by a beautiful and fertile valley, from 7 to 20 m. in width, is the Anti-Libanus chain, generally lower, though in its loftiest summit, Mt. Hermon, rivalling the highest peaks of the Lebanon range. East of Hermon, a chain of low mountains stretches E. past Damascus; below it the country is hilly, and, viewed from the deep depression of the Jordan valley, seems mountainous. The mountains of Gilead E. of the Jordan form the culminating point of these hills. Further E., in the Hauran, is a lofty table land, waterless, and with vast black bowlders and rocks scattered over its face. The most remarkable feature of the topography of Syria is the extraordinary depression of the valley of the Jordan. The valley of Cœle-Syria, between the Libanus and the Anti-Libanus, is about 70 m. long, and is elevated about 2,300 feet above the sea; it formerly contained Heliopolis or Baalbec, and other great cities. At its southern termination it divides into two branches, one cutting through the Lebanon range in the narrow gorge through which the Leontes finds its way to the sea, the other striking off southward and descending rapidly for 15 m. to the source of the Jordan at the W. base of Hermon. Passing onward with a steady but rapid slope, at the plain El-Huleh it is at the sea level; at the lake of Tiberias it is 653 feet below it; and within 60 m. of direct distance, though by the circuitous channel of the river nearly 200 m., at the Dead sea, it is 1,312 feet below the Mediterranean. No similar river valley is known. Among the level tracts of Syria, beside Cœle-Syria, may be named the great plain of Esdraelon, that of Sharon, and the arid sandy plain of Gaza. The Hauran is, but for its black basaltic rocks, much like some of the steppes of Higher Asia. Around Damascus, an oasis in the desert, vast plains of sand extend E. and S., and cover the region where once stood Palmyra.—The geology of Syria is interesting. In the extreme south are only primitive rocks, the variegated granite of the Sinaitic peninsula; the deep chasm of the Dead sea, with its bitumen pits, salt mountains, and warm springs, belongs to the carboniferous era; the calcareous and sandstone formations of Hermon and Lebanon abound in fossils of the era of the new red sandstone; and the porphyry and basalt of the Hauran give evidence of their igneous origin. The soil is exceedingly fertile wherever there are sufficient rains, or irrigation can be practised; but where there is no water, it is sandy and utterly barren. The region around the Dead sea is thoroughly impregnated with salt and alkalies, and is entirely devoid of vegetation. In the S. and E. there are vast sandy wastes. The desert in which the children of Israel wandered does not properly belong to Syria.—There are few countries of the same extent in which the climate is so varied as in Syria. On the slopes of Lebanon it is cool and pleasant in the summer months, and in the winter heavy rains fall, but the cold is not severe. In the valley of the Jordan the summer heat is equal to that of the hottest portion of the tropics, and on the sea coast the summers are also very hot and unhealthy. In winter Beyrout and some of the other cities of the coast are healthy and pleasant as residences for invalids. In Jerusalem the heat is oppressive during the day in summer; rain seldom falls between the end of April and the beginning of October, and there are few clouds, and hence every thing is parched till the rainy season. Damascus is colder in winter than the western slopes of Lebanon, and snow frequently falls; yet the orange and fig thrive there. The average range of heat in the hottest part of summer at Jerusalem and Damascus is from 84° to 86° F.; in winter the two cities differ materially in temperature. In Aleppo the range of the thermometer during the year is very great, falling below zero in winter and rising above 100° in summer.—The mineral productions of Syria are iron of excellent quality, the swords and cutlery of Damascus and the iron implements of S. Syria having for ages maintained the highest reputation; a little quicksilver and some coal in the south; and in the Dead sea region salt and bitumen. Salt of very good quality is also made on the shores of the Mediterranean.—The agriculture of Syria is very rude, the implements and modes of culture being nearly identical with those in use 2,500 years ago. Still, even with this imperfect culture, the crops, wherever there are rains or irrigation can be practised, are large, and the cultivation of the soil would lead to wealth if the government were not so oppressive, and the danger from the incursions and robberies of the roving Bedouins not so great. As it is, the poor *fellah* or farmer plants and reaps his crop by stealth, and only in those portions which are least exposed to the eye of the robber and tax gatherer. Wheat, barley, durra, and spelt are largely produced, as well as rice, lentils, peas, &c.; cotton, hemp, silk, madder, indigo, sesamum, castor oil, tobacco, potatoes, capsicum, melons, cucumbers, and artichokes are also important crops. Figs, olives, mulberries, grapes, almonds, apricots, peaches, pomegranates, oranges, lemons, dates, and other fruits abound. Vineyards are numerous on the mountain slopes and in the hill country of Judæa; the grapes are large and luscious, and the wine made from them of excellent quality. Storax is produced for the market. In the vicinity of Damascus are extensive fields of roses, the petals of which furnish the attar of commerce. The sycamore, Indian fig, carob, mulberry, and pistachio trees grow abundantly, both wild and cultivated. Scammony and sumach are gathered about Mt. Lebanon for exportation. The cedar, pine, and fir are found in extensive forests on the mountains, though the true cedar of Lebanon, once so highly prized for building purposes, is nearly extinct. The arbutus, terebinth, laurel, and several species of juniper occur on the table lands, where are also found dwarf oaks which produce the best gall nuts. The domestic animals are horses, of which the wandering tribes possess breeds of extraordinary speed and beauty; cattle, generally small and of inferior quality; asses and mules of large size and very serviceable; sheep and goats of several kinds, the broad-tailed variety of the former being found only in N. Syria; camels throughout the country, and the domesticated buffalo on the sea coast and in the Wady Ghab. Of wild animals, jackals, foxes, and hyænas are common in the desert mountains, and occasionally make a foray into the more populous districts; the Syrian bear has his home in Mt. Lebanon; wolves and wild boars in the northern forests, and the latter also occasionally further S.; deer are also found in the N., and antelopes in the desert regions; and hares, porcupines, and jerboas are abundant. There are no poisonous serpents. Silkworms are reared extensively in the mountainous districts. Turtles and tortoises are found in considerable numbers. Fish are abundant in some of the inland lakes, though not plentiful along the coast of the Mediterranean. The manufactures are few and coarse. (See TURKEY.)—The inhabitants are of a great variety of races and religions. The ruling race are the Osmanli Turks, who form but an insignificant portion of the Mohammedan population, who are mostly Arabs, and number about 1,500,000; they are bigoted and hostile to Christians, and are strict in their adherence to Soonnee or orthodox Islamism. There are 4 sects usually considered Mohammedan dissenters, though it is difficult to say whether all of them should be reckoned as Mohammedans or not. The Metawelis are the followers of Ali, the son-in-law of Mohammed, and are allied to the Sheeahs or Shiites of Persia; they are exceedingly strict in their ceremonial observances, and regard every thing touched by those not of their faith as unclean; they number about 30,000, and are found W. of the Orontes, and on the S. part of the Lebanon range. The Nusaireyeh or Ansairiyeh, inhabiting the mountains extending from the great valley N. of Lebanon to the gorge of the Orontes at Antioch, and numbering about 60,000, keep their religious views a secret; they are represented as holding to a mixture of paganism, Mohammedanism, and Christianity, are often called devil-worshippers, and acknowledge a belief in transmigration of souls; they are a wild, savage race, given to plunder and bloodshed. The Ismailiyeh, occupying the mountains W. of Hamah, are few in number, and were originally Sheeahs; they are the descendants of the people known in the time of the crusades under the name of Assassins. (See Assassins.) The 4th sect is the Druses, numbering about 70,000, and the most fanatical of all. (See Druses.) The largest of the nominally Christian sects is that of the Maronites, who are found chiefly in the Lebanon, though they have small communities in all the principal towns from Aleppo to Nazareth. They were estimated prior to the late civil war at about 225,000. The orthodox Greeks (Greeks in religion, but not generally in blood), numbering about 120,000, are scattered throughout the cities and more level portions of Syria, and engage in agriculture and trade; they have their worship in their own language. There are dissenters also from the Greek church, the Syrians or Jacobites, a mere handful, dwelling mostly N. and N. E. of Damascus. The Greek Catholic and Syrian Catholic churches acknowledge the pope, though in some particulars they approach more nearly to the Greek than the Roman church; they are about 40,000 in all, and embrace a large number of the more wealthy Christians in Syria. The Armenians are 50,000 or 60,000 in number. There are about 25,000 Jews in Syria; those in Palestine are immigrants from foreign countries, while those of Aleppo and Damascus are descendants of Jewish families who have resided there for many centuries. There are Mohammedan schools in the cities, and the Christian sects also maintain some schools. The children of the wealthy are frequently sent to France or England for education, but the great mass of the people are very illiterate.—Syria is remarkable as the seat of some of the earliest and most powerful nations of the East, and as having been the scene of the most extraordinary events of human history. Aram seems to have been the earliest name of the region, and the central part of it is designated in the Hebrew Scriptures as Aram Dammesek, or the Aram of which Damascus was the capital. The manufactures of Damascus, its swords, its cutlery, its leather, and its rich perfumes, early gave it a reputation and prominence, which the ambition and energy of its long lines of kings greatly increased. The empire of the kings of Damascus gradually extended eastward over a part of the plain of Mesopotamia and westward to the mouth of the Orontes. It was finally overthrown by the Assyrians under Tiglath Pileser, about 750 B. C. The early inhabitants of northern Syria were descendants of Shem. From the Orontes southward, all of Palestine W. of the Jordan, and probably Gilead and the Hauran or Syria E. of the Jordan, was a region peopled by the Canaanites, descendants of Ham. The Phœnicians settled mainly along the coast of the Mediterranean, and became the earliest commercial nation of the world. Sidon, their first seat, is said by tradition to have been founded by Sidon, the oldest son of Ham; and colonies from it went forth to Tyre and Arvad, and thence to all portions of the Mediterranean and beyond. Phœnicia attained its greatest power about 1050 B. C., and it enjoyed uninterrupted prosperity for full 500 years, but was at last conquered by the Babylonians, and subsequently by the Persians. The southern parts of western and portions of eastern Palestine were inhabited by a great race, the Anakim and Rephaim, traces of whose cities yet remain in the Hauran. The S. W. coast was occupied by the Philistines, and the region adjoining the Dead sea to the E. by the Semitic Ammonites and Moabites. (See Palestine.) The equally Semitic Israelites emigrated from Egypt to Palestine during the 15th century B. C., and thenceforward for 1,600 years exerted a powerful influence in its history. (See Hebrews.) The theocracy under which they existed for more than 400 years was terminated by the election of Saul as king in 1095, and the kingdom was divided in the reign of Rehoboam, the grandson of his successor David. The 10 tribes, or Israel as they were distinctively termed, were conquered and carried into captivity by the Assyrians in 721 B. C., and their place supplied by colonists from Babylonia, Hamath, and elsewhere, who became the Samaritans of a subsequent era, and a few families of whom still exist on their ancient site. The kingdom of Judah fell before Nebuchadnezzar 133 years later, but after a 70 years' captivity the people were restored to their own land, and the second temple was built. Syria from this period, until Grecian power became paramount there, was governed by a Persian satrap resident at Damascus. The battle of Issus, 333 B. C., led to the subjection of Syria proper, Phœnicia, and Palestine to Alexander the Great. Tyre and Gaza alone stood out against him, and the former was taken by storm after a 7 months' siege. Jerusalem was threatened, but succeeded in securing his favor. On the death of Alexander, and after a long struggle of succession on the partition of his empire, the Ptolemies in Egypt received Palestine and Cœle-Syria, and Seleucus Nicator northern Syria. He founded Antioch, near the mouth of the Orontes, and made it his capital; and for several centuries it was the greatest of oriental cities. The kingdom of Syria continued flourishing under the Seleucidæ till about the close of the 3d century B. C. Antiochus the Great wrested Palestine and Cœle-Syria from Egypt. The revolt of the Jews under the Asmonean family against Antiochus Epiphanes, after a struggle of 24 years, ended in their independence (143). (See Antiochus, Demetrius Soter, Hebrews, and Seleucus.) About 63 B. C. Syria became a Roman province, and subsequently was divided into several provinces; the Herodian family ruled over Judæa and some adjoining districts, while northern Syria and the coast were under Roman proconsuls. After the destruction of Jerusalem by Titus, the whole of Syria, including Judæa, was ruled by a Roman prefect, and Antioch was the capital. It continued under the Roman and Byzantine empire till its conquest by Chosroes II. in the beginning of the 7th century, followed by that of the Mohammedans, A. D. 634. The spread of Christianity in Syria was rapid, and the great cities of the province, in their costly cathedrals, churches, and episcopal palaces, gave ample evidence of the opulence of its adherents; and fierce theological contests were waged with the western and African bishops. In 654 Damascus again became the capital of Syria and of the great Mohammedan empire. The great cities of Syria, which had scarcely yielded to any in the world in point of splendor, waned under the withering influence of Islamism, and of them all Damascus alone now retains any measure of its former grandeur. In 750 the capital was removed first to Cufah and afterward to Bagdad, and Syria thenceforth became only a province of the empire of the caliphs. About the middle of the 10th century the rival Mohammedan dynasty of the Fatimites in Egypt conquered it, and toward the close of the 11th the Seljook Turks made it a part of their empire. The cruelties perpetrated by these fanatics on Christian pilgrims visiting the Holy Land led to the crusades, and in 1099 Jerusalem was taken by storm, and the whole of Syria except Damascus and a part of Mesopotamia conquered by the Christian princes, and divided into principalities; Godfrey was chosen king of Jerusalem, Bohemond reigned at Antioch, Baldwin at Edessa, and the count of Toulouse at Tripoli. Their rule was of short duration; after repeated attacks by Noureddin and his successors, it was overthrown by Saladin in 1187. The numerous crusades which followed resulted only in their regaining a few points, and in the temporary acquisition of Jerusalem by treaty in 1229, only to be attacked and plundered by the Tartars and the troops of Melek ed-Dhabn, and the final occupation of the whole country by the Mamelukes in 1291. (See Egypt.) For two centuries the unfortunate country was the prey of the two contending Tartar powers, Tamerlane and his successors and the Mameluke sovereigns of Egypt. In 1517 it was conquered by Sultan Selim I., and from that time to our own has formed a part of the Ottoman empire. In 1832 Ibrahim Pasha conquered Syria for his father Mehemet Ali, pasha of Egypt; but in 1841, through the armed intervention of England, it was restored to the sultan. In July, 1860, an insurrection occurred on the part of the Mohammedans at Damascus, in which many Christians were slain, the Dutch consul killed, and the American consul wounded. This was followed, as it had frequently been preceded, by similar disturbances in Mt. Lebanon, between the Druses and Maronites, and a predatory conflict of several months' duration, in which nearly 150 villages were destroyed. France and England finally interfered, the outbreak was suppressed, and the prime movers were brought to punishment.

SYRIAC LANGUAGE AND LITERATURE. The Syriac language belongs to the northern or Aramaic branch of the Semitic family, which branch includes, beside it, the closely related Chaldean, or dialect of Mesopotamia. In writing it various forms of character are used, all of them, however, of kindred origin, and coming from the same source whence are derived the other Semitic alphabets. The oldest character is the Palmyrene, represented by sundry inscriptions dating from soon after the time of Christ; with this is most nearly connected the common square Hebrew character, used by the Jews from the Babylonian captivity down to the present time. Next in age is the Estrangelo alphabet, commonly employed by the Syrians till the 8th or 9th century; out of this grew, on the one hand, the Cufic, the parent of all the modern forms of the Arabic; while, on the other hand, through the Nestorian missions in High Asia, it was communicated to Tartar tribes, and grew into the modern Mongol and Mantchoo alphabets. The common modern Syriac alphabet is an adaptation of the Estrangelo to an easier and more rapid style of writing; it began to come into use in the 5th and 6th centuries, and by degrees crowded out its predecessor, which was at last employed only for headings and such like purposes. Finally, we have the Nestorian character, still in common use with the modern Nestorian Christians; it is heavier and squarer than the last named, and less altered from their common mother, the Estrangelo. All these alphabets contain the same 22 characters with the Phœnician and the Hebrew.—The position of Syria, in contact on all sides with powerful nations and developed civilizations of other races, and its subjection in turn to Persian, Greek, and Roman domination before the period of our first acquaintance with its language, are doubtless the reasons why the latter presents us the Semitic type in less purity than the other dialects of the family. It contains many Greek and Latin words, chiefly nouns, but sometimes other parts of speech, even particles; it admits to a slight extent of composition of words; it has also partly filled out the scanty structure of the Semitic verb with forms of periphrastic origin. Thus, beside the usual perfect and imperfect (or preterite and future), each of which is capable of standing for time past, present, or future, it has a distinctive present, formed by a participle and following pronoun; an imperfect, formed of a participle and the verb to be; a pluperfect, formed of the perfect (or preterite) and the verb to be; and even a future, with the adjective ready, about to. Of the Semitic conjugations, the Syriac has but 3, each with its passive; the 2d and 3d are hardly distinguished in meaning, both expressing intensive or causative action. The dual number, both in nouns and verbs, has entirely disappeared. While the language has gained something in point of precision, it has lost in simplicity, conciseness, and force, and makes the impression, as Renan says, of a tongue "dull, clear, prolix, without harmony, loaded with foreign words," and in which "the relations of ideas, so elegantly expressed in Hebrew by a small number of flexions, are lengthily and heavily set forth by the use of particles and circumlocutions."—The ancient Syriac was a vernacular dialect during the first centuries after Christ; after being raised to the rank of a cultivated literary language, chiefly in connection with the translation of the Bible and the propagation of Christianity, it maintained itself as such, unaltered, throughout the whole period of growth of the Syriac literature; and it is still the sacred language of the scattered bodies of Christians in Asia representing the ancient Syriac church, as the Nestorians and Maronites, and the St. Thomas Christians of India; it is no longer properly understood, however, even by the best instructed among them. But the popular dialects, beside undergoing inevitable change and corruption, began, after the Arab conquest and the spread of Islam over the country, first to be filled with Arabic words, then to be crowded out of use and replaced by the Arabic, until, probably in the 12th and 13th centuries, Syriac almost entirely disappeared as a spoken tongue, being retained only by a few scattered tribes in a greatly corrupted form, and principally by the Nestorian Christians of Koordistan and Persia. The vernacular dialect of these scanty remains of the once powerful and active sect of Nestorians has been lately, by the efforts of the American missionaries at Ooroomiah, raised to the rank of a written and printed language, with a Christian literature, school and scientific books, periodicals, &c. A grammar of it, by the Rev. D. T. Stoddard, has been published by the American oriental society (in its "Journal," vol. v., 1856, and as a separate work); it furnishes a very curious and interesting illustration of how even a Semitic idiom may become changed, mixed, and corrupted, when left to grow up uncultivated during a long period in the midst of foreign influences.—The Syriac literature is all later than the Christian era, and is a Christian literature, composed under Greek influence and after Greek models, so that it has a less independent interest than the other principal Semitic literatures; but, beside the important part it has played as the intermediary between Greek and Moslem science and philosophy, it is a source of very valuable historical information, especially as regards the history of the early Christian church. The oldest Syriac work still existing is the translation of nearly the whole Bible, of unknown authorship, commonly called the Peshito; it is supposed to have been made not later than A. D. 200. The earliest authors whose names, with fragments of their works, have come down to us, are a few years older; they are Bardesanes and his son Harmonius. Beside philosophical works, they composed the first hymns in the language, and fixed its poetic style, giving it a properly metrical form, dependent on accent and number of syllables, with occasional rhyme; it was the first time any Semitic dialect had been subjected to such rules. But the most prominent early Syriac author is St. Ephraem, or Ephraem Syrus, of the middle of the 4th century; with him commences the full career of the Syriac literature, which continued uninterrupted until the 9th century. It concerned itself especially with religion, the translating and commenting of the Scriptures, dogmatic and polemical theology, martyrologies and liturgies, but embraced also history, philosophy, grammar, and the natural sciences; medicine, the most important science in the Orient, was for many centuries entirely in the hands of the Syrians. A great part of this literature has been lost, and what remains has as yet been but partially worked up and made accessible. It may be said to have done its principal work in the 8th and 9th centuries, in introducing classical learning to the knowledge of the Arabs. These became the scholars of the Syrians in every department, and their translations of Greek authors are supposed to have been made, especially at the outset, almost altogether from Syriac versions and by Syrian scholars. But the Arabs soon surpassed their Syrian teachers, and became their instructors in turn; and the greatly superior vigor and ability of the new Moslem literature enabled it to crowd out of favor and out of existence that upon which it was founded, as the Arabic language crowded out the Syriac idioms. The grammatical study and culture of the Syriac began after the founding of the famous school of Edessa, long a chief centre of oriental learning, in the 5th century. The works of previous laborers in this field were effaced by those of Jacob of Edessa, of the 7th century, whose authority gave the classical and sacred dialect its final form. From his time the series of native grammarians and lexicographers is almost unbroken; of most note among them are Elias of Nisibis (11th century), John Barzugbi (beginning of the 13th century), and Barhebræus, known also as Arabic author by the name of Abulfaraj (13th century); of lexicographers, Bar-Ali and Bar-Bahlul (of the 9th and 10th centuries), are of prominent importance. Barhebræus, who is distinguished by both his Syriac and Arabic works, and in various departments of knowledge, is the last great name in Syriac literary history; from his time Syriac learning rapidly declined in the Orient, until it became, as has been remarked above, almost extinct even among those whose sacred dialect the language continued to be.—The study of Syriac was introduced into Europe in the 15th century, and the names of Ambrosius, Widmanstad, and the two Ecchellenses are prominent among those of its early cultivators. For the history of the language and literature, Assemani is especially valuable. The only comprehensive dictionary is that contained in the polyglot lexicon of Dr. Castell, and published separately by Michaelis (Göttingen, 1788). Of grammars, the best are the Latin one of Hoffmann (Halle, 1827), of which an English abridged translation has been published by Cowper (London, 1858), and the German one of Uhlemann (Berlin, 2d ed., 1857), which includes also a chrestomathy and glossary. Among the other chrestomathies published, the most useful are those of Rödiger (Halle, 1828) and Kirsch, edited with glossary by Bernstein (Leipsic, 1832). Bernstein, the ablest and most learned modern Syriac scholar of Germany, commenced in 1857 the publication of a complete lexicon; whether it is to be continued since his death (1860) is not known. Cowper and Cureton are the best English cultivators of the study, and the latter especially is doing great service by the publication of extracts from the precious collection of MSS. not long since acquired for the British museum from the convent of St. Maria Deipara in Egypt.

SYRINGE (Gr. *συριγξ*, a pipe or a reed), a tube furnished with a piston by means of which a liquid may be drawn in on exhausting the air, and then be forcibly expelled by pushing back the piston. Large hand syringes holding a gallon or more, and provided with a cross handle worked by two men, while another held the instrument, were in use in the last century in Europe for extinguishing fires. (See FIRE ENGINE.) For watering gardens, washing windows, &c., syringes have been made with a discharge pipe branching off from the bottom of the main stem, which is introduced and kept in the water while the machine is worked. A valve in the bottom preventing the return of the water through the holes by which it entered, the current is directed up the discharge pipe on the principle of the force pump or fire engine. For surgical purposes syringes are made of a variety of forms adapted to special uses; as for administering clysters, injecting fluids into the stomach or bladder, or for exhausting these organs of their contents. The stomach pump is a syringe by which fluids may be forced through a flexible tube of about ½ inch diameter passed down through the mouth into the stomach. It has a branch exhausting pipe, and is so arranged that when it has been used as a syringe for injecting, the working part may be disconnected from the tube, and the latter may be immediately attached on the other side of the valve in the place of the exhausting tube; so that when the instrument is again set in action the fluids are pumped up from the stomach, and discharged through what was the aperture for receiving the fluids. By repeating the process the contents of the stomach may be entirely washed out. The apparatus is also otherwise contrived with valves so arranged that its action may be reversed. To protect the tube in the mouth from the teeth, it is passed through a hole in a wooden guard or gag introduced between them. Syringes are also used for injecting fluids into wounds, into the cavities in teeth, and for filling veins, &c., for anatomical preparations with colored fluids or melted wax.

SYRINX, a musical instrument used by the Grecian shepherds, and now more commonly called the Pandean pipe. It was constructed of 7, 8, or sometimes 9 pieces of reed, cut of various lengths in regular gradation to form an octave, and fastened together, generally with wax. It was always considered a rustic instrument, and its invention is ascribed to Pan. It is regarded as the origin of the organ, as the first organ, made by Ctesibius of Alexandria, was a syrinx on a very large scale.—In the Greek mythology, Syrinx was an Arcadian nymph, who, pursued by Pan, ran into the river Ladon, and was changed into a reed, of which he made his pipe.

SYRTIS MAJOR AND MINOR, the ancient name of two large gulfs on the N. coast of Africa, now called respectively the gulf of Sidra and the gulf of Cabes. These gulfs were exceedingly dangerous, on account of their shallowness, the number of quicksands, and the uncertainty of the tides. The Greater Syrtis, or gulf of Sidra, is situated on the N. coast of Tripoli, and extends from the promontory of Boreum (now Ras Teyonas) on the E. side to that of Cephalæ (Ras Kharra) on the W. The distance between the two promontories is 230 m., and the greatest extension of the gulf inland is 110 m. The Lesser Syrtis, or gulf of Cabes, lies on the E. coast of Tunis, and is situated between the promontories of Zeitha on the E. and Brachodes (Ras Kapudiah) on the W.; its width is about 100 m., measuring from these points. The region between the two gulfs was called by the ancients Syrtica. Mostly a narrow sandy or marshy strip of land, now belonging to Tripoli, it was peopled by the Lothophagi, Macæ, Psylli, Nasamones, and other Libyan tribes, beside whom Egyptians and Phœnicians established settlements on the coast. Cyrene and Carthage contended for its possession, and two Carthaginian brothers, the Philæni, are said to have decided in favor of their country by allowing themselves to be buried alive on the boundary line which they claimed. This easternmost spot was known as the "Altars of the Philæni."

SYRUS, Publius. See Publius Syrus.

SZALAY, László, a Hungarian publicist and historian, born in Buda, April 18, 1813. He studied at Stuhl-Weissenburg and Pesth, was admitted to the bar in 1833, travelled through western Europe, and was elected a member of the diet of 1839–'40 by the city of Karpfen. In this capacity he was active in elaborating with Francis Deák and others the celebrated project of a penal code adopted by the lower house of that assembly. Having edited for some time the *Themis*, and subsequently the *Budapesti szemle* ("Buda-Pesth Review"), he succeeded Kossuth in July, 1844, as editor of the *Pesti hirlap* ("Pesth Journal"). His own more important contributions, with other productions, were collected under the title of *Publicistai dolgozatok* ("Publicistic Writings," 2 vols., Pesth, 1847). This was followed by his *Statusférfiak kōnyve* ("The Book of Statesmen," Pesth, 1847 *et seq.*), a collection of political biographies, which was very favorably received. In 1848 he was sent by the national Hungarian ministry as envoy to the provisional central government of Germany at Frankfort, whence he soon after retired to London, and subsequently resided in Switzerland, until allowed to return to Hungary about the beginning of 1861, where he became a prominent member of the diet of that year, assembled at Pesth. His principal work is *Magyarország története* ("History of Hungary," Leipsic and Pesth, 1850 *et seq.*), of which 6 vols. have appeared.

SZÉCHÉNYI, István, count, a Hungarian statesman, born in Vienna, Sept. 21, 1791, died at Dōbling, April 8, 1860. The descendant of a family distinguished in the history of his country, and the son of Count Francis Széchényi, the founder of the national museum at Pesth, he received an education befitting his rank and future position, served for some years in the last struggles of Austria against Napoleon, after the peace travelled through Europe, and in 1825 took his seat in the upper house of the diet of Presburg, of which he at once became the animating spirit. He imitated the liberality of his father by contributing the sum of 60,000fl. ($30,000) toward the foundation of the Hungarian national academy, and was elected its vice-president, a position which he retained till his death. Assuming the leadership of the national party, he partly inaugurated, partly promoted or carried through a number of reforms, which not only quickened the material and moral progress of the country, but also attracted the attention of Europe. Among the measures almost exclusively due to Széchényi were the introduction of horse races, the foundation of the national theatre and of a conservatory of music at Pesth, the construction of the suspension bridge over the Danube now connecting that city with Buda, the removal of the rocks which formerly impeded the navigation of the lower Danube at the Iron Gate, the introduction of steam navigation on that river, making it the principal commercial artery between Germany and Constantinople, the improvement of the channel of the Theiss, and the foundation of various industrial associations. To popularize these and other schemes of material or political reform, he wrote a number of pamphlets and books, both in Hungarian and German, of which *Hitel* ("Credit," Pesth, 1830) and *Világ* ("Light," Pesth, 1832) are best known. But while he thus gained the well merited title of "the father of reform" in his country, and the disputed one of "the greatest Hungarian," he was outstripped in the political arena by younger, more democratic, and more eloquent popular favorites. Francis Deák became the leader of the diet, and Louis Kossuth founded that powerful organ of public opinion, the *Pesti hirlap*. Széchényi, an unwavering admirer of English political institutions, foresaw a revolution and a certain catastrophe in that movement, and warned the nation in his *Kelet népe* ("People of the East," Pesth, 1840), in which he denounced the revolutionary tendencies of the new journal. Kossuth vindicated his course in his *Felelet* ("Answer"); Baron Eōtvōs, too, wrote in his defence; and public opinion sustained him. Széchényi now held an isolated position, as the head of a small *juste milieu* party, between the liberals or "rapid progressists," as they were called by their opponents, and the conservatives under Count Emil Dessewffy. The *Jelenkor* ("Present Age") was his organ. Before the opening of the diet in 1847 he wrote his "Political Programme," and in order to combat Kossuth, who was elected a representative of the county of Pesth, on his own ground, he had himself elected in Wieselburg a member of the lower house, thus vacating his seat as magnate in the upper. But Kossuth's eloquence defeated all opposition, and the events of February and March, 1848, made him the master of affairs in Hungary. Széchényi yielded to the current, and even entered the Batthyányi-Kossuth cabinet as minister of public works. His mental powers, however, were shaken, and when the intrigues of the Vienna camarilla and cabinet had ripened the civil war in Hungary, he saw the fatal abyss of which he had so often forewarned the nation now opening before it. Uninspired by that confidence in the heroism of his people which animated Kossuth, he lost all hope, and on the opening of the decisive struggle (Sept. 1848) also the balance of his mind. He was taken to an insane asylum at Dōbling near Vienna, in which he spent the remainder of his life. After some years, however, having sufficiently recovered from the shock, he again eagerly followed the political movements in his country, and from his retirement was active for its regeneration. By continual intercourse with the principal Hungarians and other eminent men, he was not without influence in Hungary and abroad, and he is also regarded as the author of *Ein Blick*, &c. (London, 1859), a most violent diatribe against the Austrian minister Bach and his system. In March, 1860, a strict search of his abode and papers was executed by the Austrian police, which, together with the simultaneous loss of a friend, is said to have rendered him again insane. Soon after he was found dead in his room, killed by a pistol ball. The universal manifestation of national grief and indignation which followed the receipt of the news of this catastrophe in Hungary became so overwhelming, that even before the celebrations in honor of his memory were over the Austrian government was again compelled to yield; and the first anniversary of Széchényi's death was celebrated by a new national diet assembled at Pesth (April, 1861).

SZEGEDIN (Hun. *Szeged*), a free royal town of Hungary, capital of the county of Csongrád, situated on the right bank of the Theiss, opposite the mouth of the Maros, 60 m. W. from Arad and 89 m. S. E. from Pesth; pop. in 1857, 62,700, chiefly Magyars and Slavi. It stands in a marsh, and is divided into the town proper and the upper and lower suburbs. The river is crossed by a bridge of boats, and the town defended by an old fortress built by the Turks in the 16th century, which is surrounded by walls and ditches and entered by two bridges, and contains extensive barracks, a house of correction, and a church of its own. The corn market stands by itself, and consists of a row of houses, the town house, large barracks, and several factories. The principal manufactures are different kinds of cloth, tobacco, soda, and soap; and vessels for the navigation of the Theiss are built in considerable numbers. The town is connected by railway with Pesth, as well as with Temesvár. It was a place of considerable importance during the Turkish sway in Hungary, and in the summer of 1849, for a short time, the seat of the revolutionary government and the national assembly.

SZEKLERS. See TRANSYLVANIA.

SZEMERE, BERTALAN, a Hungarian statesman and author, born at Vata, in the county of Borsod, Aug. 24, 1812. He received his early education at Miskolcz and Käsmark, went through a course of philosophical and legal studies at Patak and Presburg, in 1836–'7 travelled through Germany, Belgium, Holland, Great Britain, France, and Switzerland, subsequently held various offices in his native county, and was elected by the same to the diet of 1843–'4 and 1847–'8. His *Utazás külföldön* ("Travels Abroad," 2 vols., Pesth, 1840), two pamphlets advocating the introduction of the Pennsylvania prison system and the abolition of capital punishment, and his boldness and eloquence in defence of popular and national rights, had made him a favorite of the public, as well as one of the principal leaders of the opposition party, when the revolution of 1848 called the latter to the administration of the country. Szemere was appointed minister of the interior in the Batthyányi cabinet, being also elected representative of Borsod in the national assembly of Pesth, became subsequently a member of the "committee of defence," officiated for some months as commissary of the revolutionary government in upper Hungary, and on the declaration of independence in Debreczin was chosen by Kossuth president of the new ministry, with the portfolio of the interior. In all these capacities he displayed an untiring activity and great energy, beside being conspicuous for his democratic and republican demonstrations. He opposed the transfer of dictatorial powers to Görgey, and after the surrender of the latter escaped to Constantinople, and thence went to Paris, where he has since resided. In exile he published, beside some minor writings, *L. Batthyanyi, A. Görgei und L. Kossuth* (Hamburg, 1851), in which he vehemently assails the two latter, and "Hungary from 1848 to 1860," in letters to Cobden, Lord Palmerston, and Count Cavour (London, 1860).—Two elder members of the same family, PÁL (born 1785) and MIKLÓS (born 1804), enjoy a considerable reputation as poets.

SZIGLIGETI, JÓZSEF, a Hungarian dramatist, born in Grosswardein in 1814. He studied in his native town, and at the age of 20 joined a company of actors at Buda, with whom, on the foundation of the national theatre at Pesth, he permanently attached himself to this institution. Not conspicuous as an actor, he has proved a very successful author of plays, especially of the light and popular kind. Among his numerous productions are: *Vazul*, *Ál Endre* ("Pseudo-Andrew"), *Szökött katona* ("The Deserter"), *Két pisztoly* ("Two Pistols"), and *Zsidó* ("The Jew").

T

T, the 20th letter and 16th consonant of the English and other alphabets derived from the Roman, the 19th of the Greek (*tau*), and the 9th of the Hebrew (*tet* or *teth*). It is of the denti-lingual class, and represents the sound produced by a forcible emission of the breath after placing the tongue against the roof of the mouth near the roots of the teeth. This forcible emission of the breath is the principal distinction between the sounds of *t* and its sonorous counterpart *d*. In etymology it is interchangeable with *d*, and sometimes with *th*, *p*, *s*, and *l*. By itself it has but one sound; but combined with *h*, it forms a compound sound as in the word *thigh*, which sound the Anglo-Saxons represented by ð, the Greeks by θ (*theta*), and the Hebrews by ת (*tav* or *tau*); or as in the word *thy*, which sound the Anglo-Saxons represented by þ; for neither of these sounds has the English a separate character. In French *t* is dropped in many words from the Latin where it is preceded and followed by a vowel; as in *père*, *mère*, *vie*, from *pater*, *mater*, *vita;* also from the termination of many words. In French and English, before the vowel *i*, *t* has the sound of *sh*, as in *fruition*.—As a Greek numeral τ stood for 300, ͵τ for 300,000. Among the Latins T represented 160, and with a dash above it ($\bar{\text{T}}$) 160,000. As an abbreviation it stands for *theologia*, as in S. T. D., *sacræ theologiæ doctor;* and in ancient writings, monuments, or coins, for Titus, Titius, Tullius, and sometimes *tribunus*. (See D.)

TABASCO, a S. E. state of Mexico, bounded N. by the gulf of Mexico, E. by Yucatan, S. by Chiapas and Guatemala, and W. by the territory of Tehuantepec; area, 18,996 sq. m.; pop. 75,901, chiefly Indians. The coast is indented by several bays and lagoons, and there are some islands toward its E. extremity, the most important of which are Laguna, Carmen, and Puerto Real. The surface is generally flat and in some places marshy, and there are several small lakes. The rivers, with the exception of the Usumasinta and Tabasco, are generally small, and they all overflow their banks at certain seasons. The climate is hot and unhealthy; and between September and March gales of wind render navigation dangerous even on the rivers. Oak, cedar, and mahogany abound. Cacao, coffee, pepper, sugar cane, palmetto, tobacco, maize, and rice are cultivated. Capital, San Juan Bautista.

TABERNACLE (Lat. *tabernaculum*, tent; Heb. *ohel*), the name of the portable sanctuary which the Israelites carried with them in their migrations through the desert, and which, after the conquest of Canaan, was set up in various towns of Palestine until the time of Solomon, when it was replaced by the temple of Jerusalem. It was constructed, by order of Moses, by Bezaleel and Aholiab, and set up for the first time on the first day of the first month in the second year after leaving Egypt. Its framework consisted of 48 perpendicular gilded boards of acacia wood, which were kept together by golden rings and fixed into silver sockets. Over these boards 4 coverings were spread. The entrance, which was turned toward the east, was closed by means of a splendid curtain, supported by 5 columns. The interior was divided by a curtain into two rooms, the sanctuary and the holy of holies. In the sanctuary was placed, on the north, the table with the 12 loaves of shew bread (see Shew Bread); toward the south the golden candlestick; and in the middle the altar of incense. In the holy of holies stood the ark of the covenant. The tabernacle was surrounded by a kind of courtyard which was 100 cubits long and 50 wide. The typical significance of the tabernacle has been, ever since the times of Philo and Josephus, a subject of investigation. The most important treatises on the subject in modern times are by Creuzer, *Symbolik des mosaischen Cultus* (2 vols., Heidelberg, 1837-'9), and Friedrich, *Symbolik der mosaischen Stiftshütte* (Leipsic, 1841).

TABERNACLES, Feast of (Heb. *'hag has-sukoth*), one of the 3 great festivals of the Jews, observed after harvest, and commencing on the 15th day of the month Tisri. It was instituted to preserve the remembrance of the goodness of God, who protected his people in the wilderness when they dwelt in tents or booths. It continued 8 (among the Jews in exile 9) days, the first and last (in exile the two first and two last) of which were the most important and solemn. To the ceremonies of the festival belongs the waving toward the 4 quarters of the world of fine fruits and leafy branches amid the singing of liturgical songs, commonly called, from the repetition of the words *hosia' na* (Oh save!), Hosanna. On the 7th day this was repeated, for the last time, with greater solemnity. During the first 7 days the living in booths was obligatory, which is still partially observed by the Jews in most countries. Sacrifices took place in the temple, and in later times also a ceremony of "pouring water" on the sacrifice, and a great illumination of the outer court, connected with dances by torchlight.

TABOO, a word formerly used by the Polynesian islanders to indicate both a religious consecration and a political prohibition exercised by the chiefs. All things reserved for the service of their idols were *taboo*, and no person but the priests, and especially no woman, might touch them; lands were also thus consecrated, and when the sign of taboo was raised over them, no profane foot might intrude. The chiefs were also accustomed to taboo certain articles of food or clothing which they desired to reserve for their own use, and thus often occasioned great distress by depriving the common people of them. It is used in English to signify a total prohibition of intercourse with or approach to the thing tabooed.

TABOR, Mount (Gr. Αταβυριον; now *Jebel et-Tur*), an insulated eminence in the plain of Esdraelon, about 6 m. S. E. from Nazareth, in Galilee, commonly regarded as the scene of the Saviour's transfiguration. It is about 1,000 feet high, composed entirely of limestone, and its sides are covered up to the summit with the valonia oak, wild pistachios, myrtles, and other shrubs. Its summit is a plateau of some 600 yards in extent from N. to S. and about half as much across. All around this plain there are traces of an ancient wall, and below it on the S. E. side of the hill are the ruins of a fortification, a gateway of Saracenic architecture called "the gate of the wind," and a small vault where the Latin monks from Nazareth celebrate an annual mass in memory of the transfiguration. Among the ruins of a church on the N. side of the mountain the Greeks observe the same festival. Tabor is several times mentioned in the Old Testament, and before it Deborah and Barak assembled the warriors of

Israel previous to the battle with Sisera. There was upon it a city of the Levites of the tribe of Zebulon, which was taken and fortified by Antiochus the Great, 218 B. C. In 53 B. C. a battle was fought near it between the Romans under the proconsul Gabinius and the Jews under Alexander the son of Aristobulus, in which 10,000 Jews were slain. Tabor is not named in the New Testament, and was first mentioned as the place of the transfiguration in the 4th century. At the foot of it the crusaders several times fought the Moslems, and Napoleon gained there a victory over the Turks.

TABORITES. See Huss, vol. ix. p. 395.

TABRIZ, Tabreez, or Tauris, a town of Persia, capital of the province of Azerbaijan, situated on the left bank of the Aigi, 36 m. from its entrance into Lake Ooroomiah; pop. 80,000. It stands in a plain 4,800 feet above the level of the sea, and has ranges of bare rugged hills on 3 sides. The surrounding country is very fertile. The town is defended by a wall of sun-dried bricks, about 3½ m. in circuit, and entered by 7 gates. The most remarkable building is the citadel, which was originally a mosque, and is 600 years old; it is a lofty edifice, and contains both a cannon foundery and barracks within its walls. In many of the gardens there are ruins of magnificent buildings. Tabriz has manufactories of cotton and silk goods. It is said to have been founded by the wife of Haroun al Rashid, A. D. 791. It has been several times captured by the Turks, and frequently severely damaged by earthquakes.

TACAMAHAC. See Poplar.

TACITUS, Caius Cornelius, a Roman historian, born probably between A. D. 50 and 55, died probably in the early part of the reign of Hadrian. The few details of his personal history are to be gleaned from scattered passages in his own writings and those of his friend Pliny the Younger, and most of these can be stated only on conjecture. At about the age of 25 he was appointed to an office, supposed to have been the quæstorship, by Vespasian; he was further promoted by Titus; and in 88 he held a prætorship under Domitian. As *sacerdos quindecimviralis* he also assisted in this year at the celebration of the secular games. In 97 he was *consul suffectus*, and in 100 he assisted Pliny, who speaks in exalted terms of his oratorical powers, in the prosecution of Marius Priscus for gross misconduct during his proconsulship in Africa. There is no further record of his life, which under the orderly sway of Trajan and Hadrian was probably passed in the peaceful pursuit of literature. In 78 he was married to the daughter of Cneius Julius Agricola, to whose virtues and eminent military and administrative abilities he has paid in his *Vita Agricolæ* an affectionate tribute. His literary remains comprise the *Dialogus de Oratoribus*, the *Vita Agricolæ* above mentioned, the *Germania*, the *Historiæ*, and the *Annales*, which were probably written in the order here designated. The *Dialogus de Oratoribus*, treating of the causes of the decline of eloquence in Rome, was written in the 6th year of Vespasian, and is distinguished by a diffuse and easy style, very different from that adopted in his later works. It was formerly by no means universally ascribed to Tacitus, but commentators now generally concur in considering it his work. The *Vita Agricolæ*, written probably under Domitian and published under Nerva in 97, has been greatly admired as a specimen of biography, although the style is sometimes difficult, owing to the conciseness of statement and the corruptions of the text. It is not contained in the earliest editions of Tacitus. The *Germania*, written in 98, is a detailed account of the manners and customs of the German tribes, derived principally from the statements of traders and soldiers. Its geographical value is so slight that the credibility of the whole work has been questioned, though without sufficient reason, it would seem, as the author evidently gave most attention to the social and political aspects of his subject. The *Historiæ* embrace the period from the death of Nero (68) to the death of Domitian (96), and must have been an elaborate work, as the first 4 books and a part of the 5th, the only portions now extant, carry the narrative no further than the commencement of the siege of Jerusalem by Titus in A. D. 69. In point of style they are the most finished of all his productions. The *Annales*, the work of his mature years, commence with the death of Augustus in A. D. 14, and extend to the death of Nero, embracing a period of 54 years; and of the 16 books in which they were originally comprised only the first 4, part of the 5th, the 6th, the latter part of the 11th, the 12th, 13th, 14th, 15th, and the first part of the 16th are extant. The first 5 books were discovered early in the 16th century in the abbey of Corvey, Westphalia, and were first published in Rome in 1515. It being the purpose of the author to show the condition of the empire under the Cæsars, the emperor is made the central figure around which the events are grouped, and those happening outside of the immediate atmosphere of the imperial court are made subordinate to the general narrative. A method of treatment like this, directly biographical and only indirectly political or historical, necessitates the elaboration of striking incidents and catastrophes, and no effort seems to have been spared by Tacitus to impart dramatic point to his work. The motives of human conduct are laid bare with wonderful skill, the good and the bad men of the age pass in review before the reader, and the great events of each reign loom forth in a sort of lurid splendor. The style, though labored, is concise and vigorous, and every passage is impressed with a melancholy, almost tragic earnestness, characteristic of a man who writes with a consciousness of the social misery he depicts, and with a determination to speak the truth. Hence Bossuet has called Tacitus "the most dignified of historians," and his annals, if evincing occasionally a too evident aiming at startling contrasts, must be considered on the whole the most philosophical history which antiquity has bequeathed to us. Bötticher, in his *De Vita, Scriptis et Stilo Taciti*, has classed the peculiarities of Tacitus under 3 heads: love of variety, brevity and force of expression, and a certain poetical coloring of the language, characteristic of the writers of the later period of Roman literature. It may be added that the difficulties of his style have at all times rendered him accessible to a limited class of readers. The *editio princeps* of Tacitus, which is far from complete, was printed at Venice in 1470 by Vindelin de Spira; and of the numerous subsequent editions that of Ernesti by Oberlin (8vo., Leipsic, 1801), with the notes by Lipsius, is esteemed the best. Separate editions of his several works are also numerous. Of translations, that in Italian by Davanzati is highly esteemed; the English versions by Gordon and Murphy have little merit.

TACITUS, Marcus Claudius, a Roman emperor, born in Interamna (now Terni), Umbria, about A. D. 200, died at Tyana, in Cappadocia, April 9, 276. Previous to the assassination of the emperor Aurelian in March, 275, he held various important civil offices, the last being that of consul in 273, and was well known for his love of letters, his great wealth, and his integrity. In Sept. 275, after 6 months of what Gibbon calls a "tranquil anarchy," during which the army and the senate mutually solicited each other to select a successor to the vacant throne, Tacitus was unanimously elected emperor by the latter body. He instituted a few domestic reforms, and attempted to revive the authority of the senate; but he died within little more than half a year from the commencement of his reign. According to one account he was assassinated by the soldiers. He claimed descent from the historian Tacitus, whose works he ordered to be placed in all public libraries, and to be multiplied to the extent of 10 copies a year at the public expense.

TADMOR. See Palmyra.

TADPOLE. See Frog.

TAEL, Tale, or Tayel, a money of account in China, Japan, Siam, and Sumatra. It is in China equivalent to 1,000 cash, and is usually reckoned in the East India company's accounts at 6s. 8*d*. or $1.61, though it really varies from $1.44 to $1.60. Its value is much higher in Sumatra, where it is equivalent to 64 copangs, and as a money of account to £1 2*s*. or $5.32. In Japan its value is much the same as in China. The Dutch reckon it at 6*s*. 2*d*. sterling, or $1.49.

TÆNARUM, now Cape Matapan, a promontory of Laconia, in ancient Greece, at the S. extremity of the Peloponnesus, celebrated for a temple of Neptune possessing the right of asylum, for a cave through which Hercules was said to have dragged Cerberus to the upper world, and for a statue of Arion seated on a dolphin, to commemorate his landing on the promontory after his miraculous preservation by that animal. In the time of the Romans the place was famous for marble quarries. There was a town here called Tænarum or Tænarus, afterward Cænepolis, which was variously represented as having been built by Tænarus, a son of Jupiter, by Elatus, and by Icarius.

TAFILET, or Tafilelt, a division of Morocco, lying E. of the chain of the Atlas mountains, bounded N. by Fez and S. by the desert of Sahara. It consists of a vast plain, and is traversed by two rivers, both of which are lost in the sands of the desert. Wheat and barley are cultivated on the banks of the rivers, but dates are the chief product. The inhabitants have large herds of sheep and goats, and stuffs and carpets are manufactured from the wool. There are mines of antimony and lead.—Tafilelt, the chief town, situated in lat. 31° 45′ N., long. 4° 5′ W., 230 m. E. S. E. from Morocco, is formed by a collection of several villages; pop. 10,000. The inhabitants are mostly Berbers. A considerable trade is carried on by caravans with Timbuctoo.

TAGANROG, a fortified town of European Russia, government of Ekaterinoslav, situated near the N. E. extremity of the sea of Azof, 28 m. W. N. W. from Azof, and 68 m. W. S. W. from Novo-Tcherkask; pop. about 17,000. It stands on a rocky promontory opposite the mouth of the Don, and is a place of considerable strength. Earthenware, cordage, tallow, canvas, and leather are manufactured; there is a bell foundery, and ship building is extensively carried on. The harbor, though the deepest in the sea of Azof, cannot be entered by vessels drawing over 10 feet. Taganrog was founded in 1688 by Peter the Great. The town contains a monument to Alexander I., who died there in 1825. In July, 1855, it was bombarded by the allied gun boats.

TAGLIONI, Marie, an Italian dancer, born in Stockholm in 1804. She belongs to a family of dancers, her father, a native of Milan, having held the position of ballet master successively at Stockholm, Cassel, and Warsaw. She made her début at Vienna in June, 1822, and between 1827 and 1832 performed in Paris with great success, surpassing all her contemporaries in agility and gracefulness. Thenceforth for 15 years she was esteemed the first ballet dancer in Europe, in the chief theatres of which she fulfilled repeated engagements. She retired from the stage in 1847 with a handsome fortune, and went to reside in Italy, where she possesses a villa on the lake of Como, and a palace in Venice. *La sylphide* and *La fille du Danube* are the ballets in which she gained her greatest triumphs. In 1832 she was married to Count Gilbert de Voisins.

TAGUA PLANT. See Palm, vol. xii. p. 703.

TAGUAN. See Flying Squirrel.

TAGUS (Span. *Tajo;* Port. *Tejo*), a river of Spain and Portugal, the longest in the peninsula, and dividing it into two nearly equal parts. It takes its rise in the Sierra De Cuenca, in the province of Guadalajara near the border of Teruel, and flows N. W. for about 24 m.; then nearly W. for 20 m., receiving the waters of the Molina; then S. W. for a little more than 70 m., the Guadiela and other streams augmenting its volume. It then takes nearly a due W. course till it becomes for about 20 m. the boundary of Portugal, its principal affluents being the Jarama, which joins it a little below Aranjuez, the Cedron, the Guadarrama, the Alberche, the Alagon, and numerous smaller streams. Entering Portugal, it inclines more and more to the S. W., receiving below Abrantes the Zezere, and from that point becoming navigable for vessels of 150 tons. In the lower part of its course numerous islands occur, and for about 30 m. it spreads out into a table-like basin, 12 m. or more in width; but as it approaches Lisbon the hills on either side close up the valley, and at its mouth it is not over a mile wide. The banks of the Tagus are generally rugged and precipitous, and the plains through which it flows are dry and barren. It is only navigable a short distance and for small vessels. Lisbon, Santarem, and Abrantes in Portugal, and Talavera de la Reyna and Toledo in Spain, are on its banks; and Madrid, Guadalajara, &c., are in its basin. Its length is about 540 m.

TAHITI. See Society Islands.

TAILLANDIER, René Gaspard Ernest, called Saint René, a French author, born in Paris in 1817. He finished his education at Heidelberg, in 1841 was appointed adjunct professor of literature in the faculty of Strasbourg, and in 1850 became titular professor in that of Montpellier. At the commencement of his literary career he assumed the *nom de plume* of Saint René, by which he has ever since been known. His principal works are: *Des écrivains sacrés au XIX^e siècle* (1842); *Scot Érigène et la philosophie scolastique* (1843); *Histoire de la Jeune Allemagne, études littéraires* (1849); *Études sur la révolution en Allemagne* (2 vols., 1853); *Allemagne et Russie, études historiques et littéraires* (8vo.); and *Le poëte du Caucase, ou la vie et les œuvres de Michel Lermontoff* (1856). Since 1843 M. Taillandier has been a constant contributor to the *Revue des deux mondes.*

TAILOR BIRD, a name given to several species of East Indian warblers of the subfamily *malurinæ*, and especially to those of the genus *orthotomus* (Horsf.). In this genus the bill is slightly curved, with the tip entire; wings short and rounded, the 4th to the 8th quills equal and longest; tail long and graduated; hind toe nearly as long as the middle, and with a long, strong claw. They are familiar birds, hopping about cultivated fields and from bush to bush in search of insects and larvæ on which they feed, jerking the tail over the back in a very singular manner. The best known species is the long-tailed tailor bird (*O. longicaudus*, Horsf.), about the size of a sparrow, greenish above and white below, with chestnut crown and brown tail and wings. Its nest is a very remarkable specimen of bird architecture, being made of the living leaves of the mango and other trees, which it sews together with fibres or cotton thread, forming a hanging pouch supported by the footstalk still attached to the parent tree; the pouch is open at the top, and the nest is placed at the bottom, composed of cotton, flax, hair, and other soft substances, neatly woven together; in this hanging structure the young are safe from monkeys, snakes, and other enemies.

TAINE, Hippolyte Adolphe, a French writer, born at Vouziers, Ardennes, April 21, 1828. He was educated at the Bourbon college, was for 5 years connected with the normal school, and since 1853 has devoted himself to literary pursuits. His *Essai sur Tite Live* (18mo., 1854) received a prize from the French academy. He has also written *Voyage aux eaux des Pyrénées* (18mo., 1855); *Les philosophes Français du XIX^e siècle* (18mo., 1856); and *Essais de critique et d'histoire* (18mo., 1857); and is a regular contributor to the *Revue des deux mondes.*

TALAVERA DE LA REYNA (anc. *Talabriga*), a town of Spain, New Castile, province of Toledo, situated in a plain of great extent on the Tagus, 64 m. S. W. from Madrid; pop. about 6,000. The town was formerly divided into sections by 3 walls, 2 of which still remain; and part of the old ramparts is in tolerable preservation. It is a place of great antiquity, and was the scene of many conflicts between the Moors and Christians. On July 27 and 28, 1809, a battle was fought in the immediate vicinity, between the French, 56,000 strong, under Victor, Jourdan, and Sebastiani, and the English, 26,000 strong, and their allies numbering about 39,000, under Sir Arthur Wellesley. The French, after repeated desperate attempts to drive the British from their position, were at length repulsed with the loss of 20 guns and nearly $\frac{1}{3}$ of their numbers.

TALBOT. I. An E. co. of Md., bounded W. by Chesapeake bay and S. and E. by the Choptank river; area, 250 sq. m.; pop. in 1860, 14,795, of whom 3,725 were slaves. The surface is generally level and the soil highly fertile. The productions in 1850 were 272,963 bushels of wheat, 621,980 of Indian corn, 48,917 of potatoes, and 97,585 lbs. of butter. There were 3 ship yards, 6 grist mills, 5 saw mills, 28 churches, 2 newspaper offices, and 985 pupils attending public schools. Capital, Easton. II. A W. co. of Ga., bounded N. E. by Flint river and drained by several large creeks; area, 524 sq. m.; pop. in 1860, 13,617, of whom 8,603 were slaves. The surface is hilly and the soil good. The productions in 1850 were 655,802 bushels of Indian corn, 89,185 of oats, 162,819 of sweet potatoes, and 13,732 bales of cotton. There were 11 grist mills, 5 saw mills, 10 tanneries, 25 churches, and 492 pupils attending public schools. It is crossed in the S. E. by the Muscogee railroad. Capital, Talbotton.

TALBOT, Silas, an American military and naval officer, born in Rhode Island about 1750, died in New York, June 30, 1813. Upon the breaking out of the revolutionary war he was commissioned a captain in one of the Rhode Island regiments, and, after participating in the siege of Boston, accompanied the army in 1776 to New York. For the skill with which he directed certain operations against the British shipping in the harbor he received from congress a major's commission. He participated in the memorable defence of Fort Mifflin, Nov. 1777, where, with a severe wound in the thigh and a shattered wrist, he continued fighting until the evacuation of the work; and in 1778 he rendered valuable assistance to Gen. Sullivan by transporting the American forces from the mainland to the upper end of the island of Rhode Island. One of the most dashing exploits of the war was his capture in 1778 of the British floating battery Pigot, of 22 guns, anchored in one of the channels commanding the approach to Newport. In Sept. 1779, he was commissioned a captain in the navy, and, after cruising with success against British commerce, was in 1780 captured by a British fleet and confined in the Jersey prison ship. He was afterward removed to England, and in 1781 was exchanged. Upon the reorganization of the navy in 1794, he was again called into the public service, and superintended the construction of the frigate Constitution ("Old Ironsides"), which in 1799 was his flag ship during a cruise in the West Indies. He resigned his commission in 1801, and passed the remainder of his life in the city of New York.—See "Life of Silas Talbot," by H. T. Tuckerman (18mo., New York, 1850).

TALC. See Steatite.

TALENT (Gr. ταλαντον; Lat. *talentum*), a term originally applied by the ancient Greeks to a balance for weighing, afterward to the substance weighed, and finally to the weight itself. In the system of weights in use the talent was of the highest denomination, and was equivalent to 60 minas, each of which was equal to 100 drachmas, and each of these to 6 oboli. The values of these weights remained constant in relation to each other, while that of the units of the measure varied in different times and in different places. The system of money being based upon the weight of silver, the names of the weights employed came to be used as money values, in the same way as the English pound originally represented a pound weight of silver. No coins however are known to have been made larger than the tetradrachma, and the mina and talent were moneys of account only. The talent, when spoken of by ancient Greek writers, and not otherwise designated, is understood to refer to the Attic talent, the weight of which has been calculated from ancient coins which have been preserved, and, according to Dr. Arbuthnot, was equal to 59 lbs. 11 oz. 17¼ gr. troy weight. Previous to the time of Solon, however, who lowered the standard of money, the weight of the talent was to that named as 100 : 73. The value of the later talent has been estimated at about £198, or about $958. The Euboïc talent is generally rated as of the same value as the Attic; and the Romans reckoned the weight of each as equal to 80 Roman pounds. A talent of Ægina, which in very early times was the standard over the greater part of Greece, has been generally considered to have been in proportion to the Attic, as 5 to 3. Various other talents are named by the ancient writers, the comparative values of which have been treated in the works of Böckh and of Hussey, in Gibbon's "Miscellaneous Works" (iii. 410), and in Dr. Arbuthnot's "Tables of Ancient Coins, Weights, and Measures." The gold talent of the Greeks, or the Sicilian talent, which is the talent always meant in Homer, contained about ¾ oz. and 71 gr. avoirdupois of gold, and is supposed to have been called talent from the value of the gold being equal to that of a talent of copper, the weight of which was 1,000 times as much. The talent (*kikkar*) of the Hebrews, frequently named in the Old Testament, was a weight equal to 93 lbs. 12 oz. avoirdupois. Its subdivisions were the maneh or mina and the shekel, 100 of the latter making 1 mina and 30 minas a talent. Its value is rated at about $1,500.

TALFOURD, Sir Thomas Noon, an English author, born at Doxey, a suburb of the town of Stafford, Jan. 26, 1795, died in Stafford, March 13, 1854. He was the son of a brewer at Reading, and was educated at the grammar school of that town. He studied law at London under the direction of Mr. Chitty, the eminent pleader, and at the same time cultivated literature, for which even while a boy he had shown a marked talent by poetical contributions to a Reading newspaper. His taste for dramatic poetry led him to frequent the theatres, and he wrote much while yet a law student for the magazines, and occasionally served as a law reporter for the daily journals. In 1821 he was called to the bar; his steady application to his profession and fluent and graceful elocution soon gave him an extensive practice, and in 1833 he was made sergeant-at-law. In 1835 he was elected to parliament from the borough of Reading by the liberal party, and continued a member till 1841. In 1847 he was again elected, and held his seat till 1849, when he vacated it in consequence of being made a judge of the court of common pleas. As a member of parliament Talfourd was distinguished by his efforts in behalf of the rights of authors, for whose benefit he introduced in 1837 the copyright act which, somewhat modified, was passed in 1842. As an author he acquired his highest reputation by his first published work, the tragedy of "Ion," which was printed in 1835, and in the following year was acted with great success under the direction of Mr. Macready. "Ion" was followed by another tragedy on a classic subject, "The Athenian Captive," which was also successful on the stage, and by two others on modern topics, "Glencoe" and "The Castilian." All these dramas are deficient in real dramatic character and interest, their chief merits being smooth and graceful versification, high-toned sentiment, and a profusion of elaborate imagery. Beside several sketchy volumes of travels on the continent, Talfourd published two valuable and interesting works, containing memoirs and correspondence of his intimate friend Charles Lamb. These appeared in 1837 and 1838, and are now published as one work, "The Life and Letters of Charles Lamb." He died suddenly while delivering a charge to the grand jury and commenting on the increase of crime.

TALIACOTIUS, GASPARO (TAGLIACOZIO, or TAGLIACOZZI), an Italian surgeon, born about 1489, died in Bologna, where he was professor of anatomy and surgery, in 1553. He attained high renown for his medical lectures during his life, but is now mainly remembered for what has been named from him the Taliacotian operation, for the restoration of lost noses, ears, &c. Though this operation was not original with him, yet he carried it to greater perfection and was more successful in restoring the lost features than any of his predecessors. His process was fully detailed in his posthumous work, *De Curtorum Chirurgia per Insitionem Libri II.* (2 vols. fol., Venice, 1597). His method was to replace the nose by a piece from the arm, leaving one end attached to the arm until it had formed a vital connection with the face, when it was cut off from the arm, and fashioned by long and slow processes into the semblance of a nose. The French and Indian operations have now generally superseded that of Taliacotius. (See AUTOPLASTY.)

TALIAFERRO, a N. E. co. of Ga., drained by affluents of the Ogeechee and Little rivers; area, 185 sq. m.; pop. in 1860, 4,583, of whom 2,849 were slaves. The surface is hilly and the soil generally fertile. The productions in 1850 were 193,327 bushels of Indian corn, 28,690 of oats, 29,061 of sweet potatoes, and 5,170 bales of cotton. There were 7 churches, and 180 pupils attending public schools. Granite, gneiss, sulphuret of iron, and magnetic ore are found. It is intersected by the Georgia central railroad. Capital, Crawfordsville.

TALIESIN, called also Pen Beirdd, the chief of the bards, flourished between 520 and 570. He was a native of Wales, and in the latter part of his life was in the service of Urien Rheged, a British prince, to whom many of his poems were addressed. Specimens of his compositions are preserved in the "Welsh Archæology."

TALIPOT TREE. See PALM, vol. xii. p. 702.

TALISMAN (Gr. τελεσμα, tribute, or Arab. *thelism*), primarily, a figure cast in metal or engraved upon stone, at a particular hour and under the influence of certain planets, whereby it was supposed to acquire extraordinary properties, and to be able to confer on its possessor supernatural powers. The name was afterward extended to any article, whether a production of nature or art, which possessed the same qualities. The talisman differs from the amulet in the fact that the powers of the latter are passive and only preservative from harm or injury, while the talisman, if a powerful one, and prepared under a happy conjunction of planetary influences, could, it was believed, render its owner invisible, and subject to his sway the elements or the genii; enable him instantly to pass through the air or over the seas from one place to another; to strike his adversary with a deadly blow while secure from injuries himself; to win the affections of a beloved object, &c. The talisman originated in the period when astrology was in the ascendant; but though its supernatural powers are no longer credited in civilized countries, there is yet a lingering trace of the same superstition left in the charms which are supposed to bring good luck to the possessor. In savage countries, the fetich of the African and the medicine bag of the North American Indian partake more of the character of the talisman than of the amulet.

TALLADEGA, a N. E. co. of Ala., bounded W. by the Coosa river and drained by the Chococolocco and other streams; area, 1,260 sq. m.; pop. in 1860, 23,520, of whom 8,865 were slaves. The surface is moderately hilly and the soil fertile. The productions in 1850 were 715,584 bushels of Indian corn, 115,105 of sweet potatoes, 114,550 of oats, and 8,509 bales of cotton. There were 47 churches, 2 newspaper offices, and 870 pupils attending public schools. Excellent marble is found. The Alabama and Tennessee rivers railroad is finished to Talladega, the capital.

TALLAHASSEE, a city and the capital of Florida, and seat of justice for Leon co., about 180 m. E. from Pensacola; lat. 30° 28′ N., long. 84° 36′ W.; pop. in 1860, 1,043. It is situated on an elevated plateau, and is well built and handsomely laid out. It has 2 newspapers, several schools, and Presbyterian, Methodist, and Episcopal churches. The state house is a substantial edifice, and the other public buildings are a court house, gaol, U. S. land office, and state seminary. Tallahassee is noted for its springs of pure water and its salubrious climate. It is connected with Jacksonville on the E. coast by the line of the Pensacola and Georgia railroad, completed for 60 m., and with St. Marks on the gulf by the Tallahassee railroad, 22 m. long.

TALLAHATCHIE, a river of Mississippi, the principal tributary of the Yazoo, rising in Tippah co., near the N. line of the state, and flowing in a circuitous but generally S. W. and S. course 250 m. to its junction with the Yallabusha river to form the Yazoo. It is navigable by steamboats a distance of over 100 m., and at high water still further.

TALLAHATCHIE, a N. W. co. of Miss., intersected by the Tallahatchie and Yallabusha rivers; area, 930 sq. m.; pop. in 1860, 7,892, of whom 5,054 were slaves. The surface is level and in many places swampy, and the soil fertile. The productions in 1850 were 190,980 bushels of Indian corn, 38,052 of sweet potatoes, and 4,977 bales of cotton. There were 8 churches, and 200 pupils attending public schools. Capital, Charleston.

TALLAPOOSA, a river of Georgia and Alabama, which rises in Paulding co., Ga., and flowing S. W., S., and W. for a distance of 250 m., unites with the Coosa, forming the Alabama, about 10 m. N. from Montgomery. Its principal affluent is the Little Tallapoosa. It is navigable for steamboats a distance of over 40 m. above its confluence with the Coosa.

TALLAPOOSA, an E. co. of Alabama, intersected by the Tallapoosa river, and drained also by the Hileebee and Sawkehatchee creeks; area, 700 sq. m.; pop. in 1860, 23,827, of whom 6,672 were slaves. The surface is hilly and the soil in some parts fertile. The productions in 1850 were 462,276 bushels of Indian corn, 60,423 of oats, 102,371 of sweet potatoes, and 6,589 bales of cotton. There were 7 grist mills, 2 cotton factories, and 24 churches. Its S. border is intersected by the Montgomery and West Point railroad. Capital, Dadeville.

TALLART, or TALLARD, CAMILLE DE LA BAUME, count de, a French general, born Feb. 14, 1652, died in Paris in 1728. He entered the army under Condé in Holland, and subsequently served under Turenne in Alsace, became a brigadier in 1677 and major-general in 1687, commanded an army corps on the Rhine in 1690, was raised to the rank of lieutenant-general and sent as ambassador to England in 1693, and in 1698 and 1700 signed two treaties with William III. relative to the Spanish succession. In 1703 he was made marshal of France, and gained a victory over the prince of Hesse at Spire, but was defeated and made prisoner by his own fault in the battle of Blenheim the next year. After 7 years of captivity he returned to France, and was made duke of Hostun and a peer in 1712, took sides with the Jesuit Le Tellier against Cardinal de Noailles, in 1715 became one of the council of regency, and in 1726 secretary of state.

TALLEYRAND-PÉRIGORD, CHARLES MAURICE, prince de, a French statesman, born in Paris, Jan. 13, 1754, died there, May 20, 1838. The eldest son of a family who claimed the first rank among the nobility of southern France, he was sent out to nurse and quite neglected by his parents; an accident which befell him, when scarcely a year old, rendered him lame for life. At the age of 12 he was placed by an uncle at the Harcourt college in Paris. Two years later, it being ascertained that his lameness could not be cured, a family council decided that his birthright should be transferred to his younger brother, and destined him for the church. He was consequently entered at the theological seminary of St. Sulpice; but he neglected the study of theology for literature and science. He was introduced to society in 1774 as the abbé de Périgord, and at once evinced all the propensities of a confirmed rake, so much as to occasion his confinement for several months in the Bastile and at Vincennes. He however soon distinguished himself by refined taste and great conversational powers; and in 1780, through the influence of his family, he was appointed to the important office of general agent for the clergy of France, in which capacity he displayed remarkable business talent. He mingled in the financial discussions of the time, became acquainted with Mirabeau, Calonne, and Necker, and was noted for his prudence and skill as a speculator. In 1787 he was one of the assembly of notables, and the next year was made bishop of Autun, which gave him a yearly income of 60,000 francs, with a prospect of becoming archbishop of Rheims and a cardinal. Such was not however the aim of his ambition, as from the beginning he had looked upon his profession with a mingled feeling of disgust and contempt. When the states-general were summoned in 1789, he was elected one of the deputies of the clergy, insisted upon his colleagues joining at once the representatives of the third estate who had assumed the name of "national assembly," figured conspicuously among Mirabeau's friends, and proved a strong supporter of every liberal measure. It was he who moved the celebration of the great patriotic feast, styled the "federation," on July 14, 1790; and in his capacity of bishop, at the head of 200 priests, wearing the national colors over their white robes, he officiated in that solemnity upon the great altar erected in the midst of the Champ de Mars. In the assembly he reported a plan for the reorganization of public instruction, which plan and report are still considered masterpieces of ingenuity; he advocated the abolition of ecclesiastical tithes, the assumption by the government of the lands belonging to the clergy as national property, and the establishment of a civil constitution for that order; and on this constitution being adopted, he consecrated such priests as consented to take the oath to it. This, added to his many deficiencies as a Catholic bishop and his political course, caused him to be excommunicated by the pope. He attended Mirabeau in his last moments, and was charged by the great orator to deliver in the assembly a speech he had prepared upon testamentary powers and the rights of succession. On the adjournment of the constituent assembly, Oct. 1, 1791, Talleyrand was sent, under Chauvelin, on a mission to England to promote friendly relations between that country and France; but he was coldly and even disdainfully treated, his exertions proved fruitless, and he returned home previous to Aug. 10. After the king's fall he retired to England; but, while a warrant was issued against him in Paris by the committee of public safety (1793), he received peremptory orders from the ministry to leave England in 24 hours. He then sailed for the United States, where, through successful speculations, he accumulated a fortune, and carefully studied American institutions and commerce. Before the adjournment of the convention, on motion of Chénier, acting under Mme. de Staël's influence, his name was erased from the list of emigrants; he returned to Paris, found himself a member of the academy of moral and political sciences, was one of the original members of the constitutional club, and in July, 1797, was called to the ministry of foreign affairs. On Bonaparte's return from Italy, Dec. 5, he welcomed him, introduced him to the directors, delivered a speech in his honor at his great official reception, and promoted his subsequent designs. While the young general sailed for Egypt, the diplomatist was to repair to Constantinople in order to reconcile the sultan to the invasion of one of his provinces; he however neglected this mission, and continued in office till June, 1799, when he was forced to resign, his diplomacy not having fulfilled the expectations formed of it. When Bonaparte returned from Egypt, he again propitiated the conqueror, procured an interview between Bonaparte and Sieyès, and prevailed upon Barras to resign, thus greatly contributing to the success of the *coup d'état* of the 18th Brumaire. He was rewarded by his reappointment, in Dec. 1799, as minister of foreign affairs, which office he held for nearly 8 years. His pliancy, aristocratic associations, and refined manners suited the new master of France, under whose leadership he aided in the reëstablishment of the peace in Europe, taking part in the successful conclusion of the treaties of Lunéville, 1801, and of Amiens, 1802. In 1804 he was released from excommunication and his clerical vows, and, yielding to Bonaparte's injunction, took formally as his wife Mme. Grant, with whom he had lived for the last 7 years. His influence was now on the wane, or at least his advice was less complacently listened to. In 1806 he received the office of grand chamberlain and the principality of Benevento in Italy. Having vainly advocated an alliance with England, and feeling the growing coldness of the emperor, he resigned his ministerial office, Aug. 9, 1807, and received the title of vice grand elector, to which a large salary was attached. Thenceforth he was only occasionally consulted by his sovereign, but gave very free expression to his views upon great political questions, and was in consequence deprived of his office of chamberlain in 1809; but this only stimulated his sarcastic criticisms against the imperial policy. As early as 1812 he is said to have foretold the approaching overthrow of the unruly conqueror. He accordingly prepared himself for the crisis, and so skilfully manœuvred that on its occurrence he was looked upon, at home and abroad, as the most influential statesman of the day and the leader of the new revolution. A last interview between him and the emperor in the beginning of 1814, during which he was very harshly treated by Napoleon, completed the estrangement between them; and Talleyrand, although still a dignitary of the empire and one of the council of regency, thought of nothing but ruining his master. While the latter was accomplishing wonders of skill and valor on the battle field, he secretly sent word to the allied sovereigns to hasten toward Paris; and when that metropolis surrendered, March 30, he offered his hotel to the emperor Alexander. His management secured the appointment by the senate, on April 1, of a provisional government, and its formal declaration on the following day that Napoleon was dethroned. While Marshal Marmont was prevailed upon to sign at Essonne (April 3) a convention that baffled Napoleon's last hopes of resisting, Talleyrand welcomed the count of Artois to the French metropolis, April 12, and remained the head of the new government. On the arrival of Louis XVIII. he was appointed (May 12) minister of foreign affairs, holding in fact the premiership in the cabinet; and on June 4 he was made a peer of France. He negotiated the first treaty of Paris, May 30, 1814; and 4 months later he was sent as minister plenipotentiary to the congress of Vienna, where, notwithstanding his superior abilities as a diplomatist, he failed in protecting the interests of France as well as he desired. He was overtaken there by the sudden return of Napoleon from Elba, and participated in the declaration that "outlawed the enemy of nations." He was excepted from the amnesty granted to those who had previously deserted the emperor, repaired to Ghent, where he joined the exiled king Louis XVIII., accompanied him to France when he returned there after the battle of Waterloo, and resumed, July 8, 1815, the premiership in the cabinet and the ministry of foreign affairs; but being disgusted by the hard terms imposed upon France by the allied powers and by the reactionary tendencies of the new chamber of deputies, he resigned his office at the end of a few weeks. According to another account, having become obnoxious to the emperor Alexander, he was dismissed; but through the duke of Richelieu's entreaties he received the title of grand chamberlain of France, with a salary of 40,000 francs. He still visited the Tuileries, but was coldly received; he retained his seat in the chamber of peers, and delivered there several opposition speeches; but his influence was greatest in social intercourse, his saloon being the gathering place of politicians of every shade of opinion. After the revolution of July, 1830, he was appointed ambassador to England with a princely salary, and succeeded in negotiating a treaty, April 22, 1834, by which France, England, Spain, and Portugal united for the pacification and settlement of the two peninsular kingdoms. Satisfied with this last performance, he resigned his office, Jan. 7, 1835, and retired to private life. In 1838 he delivered the eulogium on Count Reinhardt before the academy of moral and political sciences. During his latter years he returned to the observance of ecclesiastical rites, and died reconciled to the church. The most remarkable of his essays is his *Mémoire sur les relations commerciales des États Unis vers* 1797. He left personal memoirs, which are supposed to throw considerable light upon the events in which he participated, and are to be published, according to his will, 30 years after his death, that is to say, in 1868.

TALLIEN, Jean Lambert, a French revolutionist, born in Paris in 1769, died Nov. 20, 1820. He was the son of the house steward of the marquis de Bercy, who gave him the means of a classical education, and when the revolution broke out was for a while connected with the newly established *Moniteur* as proof-reader. In 1791 he started a newspaper of his own, *L'ami du citoyen*, which passed unnoticed, became a member of the Jacobin club, was appointed clerk of the commune, Aug. 10, 1792, and was elected deputy to the convention by the department of Seine-et-Oise. He took his seat among the *montagnards*, evinced some oratorical talent, voted for the death of Louis XVI., and proved one of the bitterest opponents of the Girondists. Being sent on a mission to Bordeaux in 1794, he became acquainted with Mme. de Fontenay, one of the most fascinating women of her age, then a prisoner on account of her suspected royalism, and whom he married on his return to Paris. His love for her somewhat abated his revolutionary fervor, and Bordeaux was treated with comparative mildness. This, in conjunction with his known friendship for Danton, awoke the suspicions of Robespierre; his wife was again imprisoned, and was in peril of her life, when, yielding to her entreaties, he resolved upon overthrowing the tyrant. After securing the combined assistance of Robespierre's enemies, he denounced him in a virulent speech on the 9th Thermidor, and by unfaltering energy succeeded in procuring from the convention an order of arrest against the dictator, and then bringing him to the scaffold. This triumph made him the leader of the Thermidorians; through his influence Fouquier-Tinville, Carrier, and Lebon were doomed to condign punishment; and through his energy the revolutionary attempt of the 1st Prairial was baffled. As commissary of the convention near the army of the west in 1795, he ordered all the royalist prisoners made by Hoche on the Quiberon peninsula to be shot. On the 13th Vendémiaire he was among the unterrified defenders of the convention against the rebellious sections of Paris. After the establishment of the directorial government he was a member of the council of 500, and shared in the republican *coup d'état* of the 18th Fructidor. In 1798 he sailed with Bonaparte for Egypt, as one of the committee of scientific men, and held there a high administrative office. While returning to France he was taken prisoner by the English, and welcomed to London by the whig party. When he finally reëntered France, his fortune changed. Bonaparte treated him coldly and declined granting him any office; his wife was divorced from him, afterward becoming the princess of Chimay (see Chimay); and he was neglected by all. In 1805 he was appointed consul to Alicante; but sickness obliged him to return to Paris, where he received a paltry pension from Napoleon. This he lost in 1814, and would have starved had he not received some help from his old friend Barras.

TALLMADGE, Benjamin, an American revolutionary officer, born in Setauket, Long island, Feb. 25, 1754, died in Litchfield, Conn., March 7, 1835. He was graduated at Yale college in 1773, entered the continental army at the commencement of the revolution, attained the rank of major after much active service, and was stationed at North Castle, Westchester co., N. Y., at the time of the capture of Major André, who was placed in his custody until his execution. In 1780 he planned and conducted the expedition which resulted in the taking of Fort George at Oyster Bay, and the destruction of the British stores on Long island. He held intimate relations with Washington, and retired from the army with the rank of colonel. He afterward engaged in mercantile business at Litchfield, Conn., and from 1801 to 1817 was a member of congress.

TALLMADGE, James, LL.D., an American statesman, born in Stamford, Dutchess co., N. Y., Jan. 28, 1778, died in New York, Sept. 29, 1853. He was graduated at Brown university in 1798, studied law, and was admitted to the bar in New York. He was for some years private secretary of Gov. George Clinton, and in the war of 1812 was appointed brigadier-general and placed in command of a part of the force stationed for the defence of the city of New York. In 1817 he was elected to congress from Dutchess co., and was a prominent debater and actor in the stormy scenes which preceded the passage of the Missouri compromise bill, advocating the restriction of slavery in the region west of the Mississippi. He declined a reëlection. In 1821 he was an active member of the state constitutional convention, in 1824 was a member of the legislature, in 1825 was elected lieutenant-governor, and in 1846 was a member of the state constitutional convention. From 1833 till his death, with the exception of two years, Mr. Tallmadge was president of the American institute. In 1835 he visited Europe. He introduced American cotton machinery into Russia, and collected there and elsewhere maps and specimens of natural products for the institute. He was one of the founders of the university of the city of New York, and received from it the honorary degree of LL.D. in 1841.

TALLOW, the fat of quadrupeds, separated from the fibrous matters by melting it down, a process called rendering or trying out. It consists of a little more than ¾ stearine, and is largely employed in the manufacture of candles and soap, the dressing of leather, &c. It is obtained of various degrees of purity according to the care with which it is prepared.

When pure it is white and tasteless and has a peculiar odor. It is an important article of commerce, the largest supplies being furnished by Russia, amounting to an average of about 186,160,000 lbs. annually, at the value of about $15,500,000. It is brought to St. Petersburg from the interior, much of the best coming from Siberia. The cattle that furnish it are there fed the greater part of the year on dry fodder, and this is said to be the cause of the superior hardness of the Russian tallow. The largest portion of the exports are to England; the rest to Prussia, France, the Hanse towns, Turkey, &c. The computed value of the importations of tallow into England in 1858 was £3,042,381, of which £2,460,275 was of Russian tallow, and £115,710 of Australian mutton tallow. In 1860 they amounted to £4,014,280. The import from the United States into Great Britain in 1860 was 8,748,961 lbs., valued at $901,371. The total export from the United States during the same year was 15,269,535 lbs., value $1,598,176.—A vegetable tallow is obtained on boiling the berries and other fruits of various plants. (See TALLOW TREE.)

TALLOW TREE (*Stillingia sebifera*, Linn.), a Chinese tree belonging to the family of the *euphorbiaceæ*, from 20 to 40 feet high. It has very smooth branches, and long-petioled, rhomboidal, acuminate entire leaves, of about equal length and breadth (from 2 to 4 inches), and conspicuously pointed. The sterile flowers are small and numerous; the fruit is attached to a stalk, and is about $\frac{3}{5}$ of an inch in diameter. It is cultivated in Great Britain and America in hothouses. The fatty matter is obtained from the seed vessels and seeds, which are bruised and boiled in water, when the particles of fat rise to the surface. When cold it is of about the consistence of tallow, and beautifully white. The Chinese use it for candles, combining with it either wax or the wax-like product of the *ligustrum lucidum*, in order to give it greater hardness. It burns freely, and gives a clear light. It is also used for medicinal purposes.

TALMA, FRANÇOIS JOSEPH, a French tragic actor, born in Paris, Jan. 15, 1763, died there, Oct. 19, 1826. The son of a dentist who removed to London, he passed his childhood there, and returned when 9 years old to France, where he completed his collegiate education. He early evinced a taste for the stage, and after pursuing his father's profession for 18 months he took lessons from Molé, Dugazon, and Fleury. In 1787 he appeared at the *théâtre Français* in the subordinate part of Séïde in Voltaire's *Mahomet*, making a deep impression, and two years later became a partner in the association of comedians who were attached to that theatre. He at once attempted to substitute contemporary historical dresses for the fancy costumes then worn, and finally accomplished a complete reform. His first original creation was the principal part in Joseph Chénier's *Charles IX.*; and while his success steadily increased, he assiduously studied the improvement of his style of acting. He listened willingly to critical observations, and sought the society of such learned men and artists as could give him thorough instruction. Among those whom he saw intimately during the revolution were Louis David, the painter, and Bonaparte, then a young and poor officer, who more than once borrowed a few louis from the more prosperous comedian. Bonaparte never forgot his kindness, and when in power treated him always with special favor. Beside the parts he performed in Lafosse's *Manlius*, Racine's *Iphigénie* and *Britannicus*, and Voltaire's *Œdipe*, which he successively brought as near as possible to perfection, he won great applause in Chénier's *Henri VIII.*, and above all in Ducis' *Hamlet*, *Othello*, and *Abufar*; and under the empire he was frequently called to appear before the numerous emperors, kings, and princes whom Napoleon brought together. During the restoration, his known partiality for liberal opinions and the fallen government enhanced his popularity among the younger class of the nation, and some of his performances were political manifestations in disguise; such was especially his appearance in Jouy's *Sylla*, in which his striking resemblance to Napoleon made an unheard of sensation. Since 1796 he had devoted his undivided attention to tragedy; but in 1823 he appeared as Damville in Casimir Delavigne's comedy *L'école des vieillards*, in which he proved a worthy associate of Mlle. Mars. His last and perhaps most perfect tragic creation was the part of Charles VI. in Delaville's tragedy of that name; here it was that he evinced all his powers, and above all that dignity of manner and elocution which was so true to nature, and consequently so impressive. In 1855 a statue by David d'Angers, representing Talma in his great part of Sylla, was placed in the Tuileries garden. The great actor left a very interesting pamphlet entitled *Réflexions sur Lekain et sur l'art théatral* (8vo., 1825; reprinted in 1856). His biography has been written by Moreau, *Mémoires historiques et littéraires sur Talma* (8vo., Paris, 3d ed., 1827).

TALMUD (late Heb., study), the collective name of the Mishna and Gemara, containing the oral law and other traditions of the Jews. (See MISHNA, and HEBREWS, vol. ix. p. 41.) In a limited sense the term is used of the Gemara alone. There are two Gemaras (or Talmuds), the Palestinian (*Yerushalmi*, of Jerusalem) and the Babylonian (*Babli*). The former contains comments on 39, and the latter on 36 treatises of the Mishna. The Babylonian, which is of later date, is the principal authority. The chief commentator is Rabbi Solomon ben Isaac, known under the abbreviation Rashi. The best compendium of Talmudical decisions is the *Mishneh torah* of Maimonides. The editions of the Talmud, mostly in 12 folio volumes, including the most important commentaries and notes, are very numerous. One of the fullest is now (1862) in course of publication in Warsaw.

TAMA, an E. co. of Iowa, intersected by the Iowa river; area, 720 sq. m.; pop. in 1860, 5,285. The surface is undulating and the soil highly fertile and well timbered. There are a number of rich valleys along the streams. The productions in 1859 were 28,937 bushels of wheat, 256,697 of Indian corn, 10,412 of oats, 110,472 lbs. of butter, and 11,205 gallons of sorghum molasses. There is good water power for manufacturing purposes, though it is not much used yet. It is intersected by the proposed route of the Chicago, Iowa, and Nebraska railroad. Capital, Toledo.

TAMAQUA, a town of Schuylkill co., Penn., on the Little Schuylkill river, 16 m. E. N. E. from Pottsville, and 78 m. N. E. from Harrisburg; pop. in 1861, 4,919. It is situated in a rich coal and iron region, and has 3 founderies and machine shops, 6 collieries, gas and water works, a bank, a newspaper, and 9 churches, viz.: 2 Methodist, and 1 each Congregational, Episcopal, Evangelical, German Reformed, Lutheran, Presbyterian, and Roman Catholic. The Cattawissa and the Little Schuylkill railroads pass through the town.

TAMARIND TREE (*tamarindus*, from the Arabic *tamarhendi*, Indian date), a tropical exogen of the natural order *leguminosæ*, having pale green pinnate leaves, the flowers with 3 yellow petals streaked with red, which are alternate with the 3 upper lobes of a calyx having 5 divisions, the middle petal cucullate and the lateral ones ovate, the stamens 9 or 10, of which 2 or 3, larger than the rest, are united at the base and bear anthers, the remainder being sterile; the fruit a hard-shelled pod (legume) supported on a footstalk, 1-celled, compressed, containing 3 to 6 seeds, which are of a somewhat square form and lie within an acid pulp. The oriental tamarind (*T. Indica*, Linn.) is a handsome tree with wide-spreading branches, its wood hard, heavy, and firm, and useful as timber. Its fruit pods are large, and 6 times longer than broad; the acid pulp which they contain is dried in the sun and consumed at home, or salted or dried in copper ovens for exportation. In Africa, Arabia, and India this pulp is invaluable to travellers, both as a cooling food and in the preparation of a refreshing drink. Even the hard seeds, after parting with their astringent skins, are boiled or dried, and eaten in times of scarcity, in flavor resembling the field bean. The western tamarind (*T. occidentalis*, Linn.) is found wild in the West Indies and South America, and is to be distinguished by its pods, which are not more than 3 times longer than they are broad. It is also a large tree with spreading branches, pale green foliage, and yellow-petalled and purple-stamened flowers. A rude sort of preserve is made of its fruit, by removing the shells and packing the pulp in layers with sugar between, or by pouring boiling sirup over them, which penetrates to the bottom.—The value of tamarinds in medicinal uses is well known, their properties being nutritive, refrigerant, and laxative.

TAMARISK, the name of delicate and beautiful shrubs and herbs with polypetalous flowers, many-leaved calyx, hypogynous petals, distinct styles, and consolidated fruit. They are grouped under a distinct order of *tamariscineæ* by Desvaux, other eminent botanists not entirely agreeing in respect to their alliance with other families. The species mostly cultivated in gardens is the French tamarisk (*tamarix Gallica*), a native of Spain, France, and Italy. It is a highly elegant shrub, 12 to 15 feet high, with deciduous, very narrow, and fine scaly leaves of a light green; flowers small, pale red, growing in spikes near the extremities of the branches, and so numerous as to give the appearance of panicles. When in full blossom, scarcely any other shrub can be compared with it in beauty, uniting lightness and grace with elegance. Even the bark and twigs are conspicuous for their pleasant purple or red color. The German tamarisk (*T. Germanica*) grows only about 8 feet high; its branches are more upright, very brittle, and odorous, its bark smooth and yellowish; but the spikes of flowers and the small foliage render it equally desirable. Both are readily propagated from cuttings, and grow best in a light, rich soil. All the tamarisks are exclusively confined to the northern hemisphere of the old world, extending as far as the Cape Verd islands. They were early introduced into gardens in Britain, though preferring in their native habits the sea shore or the banks of rivers and torrents. Their bark is astringent, and abundance of sulphate of soda has been noticed in its ashes. Manna is produced by an *aphis* or *coccus* which feeds upon a species growing in the East. Salt is secreted from several, and in medicine and the art of dyeing the galls found on particular species are valuable.

TAMAULIPAS (formerly New Santander), an E. state of Mexico, bounded N. by the state of Coahuila and Texas, E. by the gulf of Mexico, S. by Vera Cruz, and W. by San Luis Potosi and New Leon; area, 29,814 sq. m.; pop. 147,133. The chief towns are Victoria, the capital, and Tampico. The coast is low and sandy, and several lagoons extend along the shore, the largest being Lake del Madre, which is upward of 100 m. long, and in some places 20 m. wide. The Rio Grande del Norte forms the northern boundary line, and the other streams of greatest importance are the Fernando or Tigre, Borbon, Santander, and Tampico; the mouths of all are so much encumbered with bars that they are almost useless for navigation. In the northern part of the state the flat country extends inland for some distance from the shore, and the surface then rises into elevated plains; but in the south it is diversified by numerous mountains and fine valleys. During the hot season the climate on the coast is unhealthy, but in the elevated parts of the interior it is temperate and agreeable. A great deal of the soil is fertile, and large numbers of cattle and sheep are reared.

TAMBOURINE, an instrument of the drum species, consisting of a wooden or metal hoop, over which parchment is distended, and which is hung with a sort of bells. It is held in either hand and beaten with the knuckles of the other. Certain peculiar effects of sound are produced by rubbing the parchment briskly with the thumb. The tambourine is one of the most ancient instruments known, and, from the graceful use which can be made of it in the various movements of the body, has always been a favorite with dancers.

TAMBOV, a central government of European Russia, bounded by Vladimir, Nijni Novgorod, Penza, Saratov, Voronej, Orel, Toola, and Riazan; area, 25,542 sq. m; pop. in 1856, 1,808,172. The surface is generally level, broken in places by low hills, and in the S. it bears a strong resemblance to a steppe, being almost devoid of trees. It is drained by the navigable rivers Moksha and Vorona, tributaries of the Oka and Don. The soil of the N. part consists principally of a light sand, and the surface is covered by extensive forests and numerous marshes. Woollen and linen cloth and iron are manufactured.—TAMBOV, the capital, is situated on the left bank of the Tzna at its junction with the Studenetz, 268 m. S. E. from Moscow; pop. about 20,000. It is a very ancient place, and is surrounded by a rampart.

TAMBURINI, ANTONIO, an Italian singer, born in Faenza, in the Papal States, March 28, 1800. After several years' practice in the theatre and churches of his native city, he made his public début at Bologna in 1818, and soon rose into great celebrity in Italy, in the chief cities of which he repeatedly performed. In 1832 he first appeared in London and Paris, and thenceforth until his retirement in 1854 was one of the annual attractions at those cities during the musical season. He was, with Grisi, Rubini, and Lablache, one of the original performers in Bellini's *Puritani*, and for several seasons continued to form one of that most remarkable quartet of singers. His voice, a baritone of great power and sweetness, was shown to the best effect in the operas of Rossini, Bellini, and Donizetti, and he was also an excellent actor both in serious and buffo opera. His finest parts were Figaro and Don Giovanni.

TAMERLANE. See TIMOUR.

TAMPICO, or SANTA ANA DE TAMAULIPAS, a town of Mexico, in the state of Tamaulipas, situated on the river Panuco, 5 m. from the gulf of Mexico, and 215 m. N. N. W. from Vera Cruz; pop. about 7,000. It is tolerably well built, and contains 2 churches, a custom house, 2 hospitals, a prison, and some monuments. The harbor is not very safe.

TAN, the ground bark of trees used in tanning leather. (See LEATHER, and TANNIC ACID.) When tan has been exhausted of its tanning property, it is still useful as a material for hotbeds, supplying long continued and uniform heat as it undergoes fermentation. It is much used by gardeners for this purpose.

TANAGER, a name given to the *tanagrina*, a very large division of the finch family, peculiar to America, and almost entirely confined to the southern portion of the continent, the latter containing nearly 200 of the more than 220 species described by Sclater. The bill has the upper mandible notched, and is usually triangular at the base and arched; the toes are armed with strong claws, and the hind toe is long and strong. They are small and brilliant birds, the prevailing colors being orange, scarlet, and black; many have a pleasing song, and a few are remarkable for their musical powers; their flight is rapid, movements active, and habits arboreal; most unite in flocks, often in the neighborhood of human habitations, but a few are solitary; the food consists of insects, fruits, and seeds. Of the 20 genera, only a few of the common ones can be here noticed.—In the genus *pyranga* (Vieill.) the wings are long and pointed, the 2d quill nearly as long as the 3d, which is longest; tail moderate and nearly even. One of the most richly colored of North American birds is the scarlet tanager (*P. rubra*, Vieill.), about 7¼ inches long and 11¾ in alar extent; the male in the breeding season is of a general bright carmine color, with the wings and notched tail velvety black; the female is dull yellowish green, which is also the color of the young and the other sex in autumn and winter. It enters the United States from Mexico early in April, arriving in New Jersey about the middle of May; it goes as far north inland as Lake Huron, and has been found breeding in New Brunswick and Nova Scotia; it is very sensitive to cold; its migrations are performed at night; its notes are lively, but not musical according to Wilson, resembling the syllables "chip, churr." The change from the winter to the summer plumage takes place very rapidly; it is a shy and unsociable bird, preferring the deep recesses of forests, and rarely approaching human habitations in crowded villages; the food consists of fruits and insects, especially wasps and bees. As in the sub-family generally, the nest is thin and coarsely made; the eggs are 3 to 5, dull greenish blue with brown and purple specks, and are ⅞ by ⅝ of an inch in size. This species is found in the eastern states as far as Missouri. The Mississippi tanager or summer red bird (*P. æstiva*, Vieill.) is 7¼ inches long and 11 in alar extent; the color is light red, brightest on the head, the back dusky, and the quills and shafts of tail feathers brown; bill light horn color, and the gape, as in others of the genus, well provided with bristles bending downward; the females olive above and reddish yellow below, as are the young males; the color is lighter and more rosy than in the scarlet tanager, and the bill is much larger. It is found in the S. Atlantic and gulf states and Guatemala, so sensitive to cold that it rarely goes further north than Massachusetts, and is not seen in the southern states after the middle of September; it is of solitary habits, preferring growths of stunted hickories and oaks. The song is like the syllables "chicky, chucky, chuck," and is chiefly at night; the food consists of insects, especially large beetles, taken on the wing; the nest is rudely made and insecurely fastened to its supporting branch; the eggs are 4 or 5, light blue, and are incubated for 12 days by both sexes. The Louisiana tanager (*P. Ludoviciana*, Bonap.) is about the same size as the last; the male is yellow, and the middle of the back, wings, and tail black; head and neck tinged with red; 2 bands of yellowish across the wings, and tertials edged with whitish; female olive green above, yellowish below, with dark brown wings and tail. It is found from Kansas to the Pacific and south to Mexico; it has a pleasing warble.—In the genus *tanagra* (Linn.) the bill is short, elevated at base, rather triangular; the wings moderate, with the 3d and 4th quills longest. There are many species, all South American, living in troops, and often committing serious depredations in orchards and gardens by destroying buds and fruits; the nest is carelessly made. The bishop tanager (*T. episcopus*, Linn.) is purplish violet, with the small wing coverts bluish white, the middle shaded with violet, the larger ashy, and the wings and tail blackish bordered with blue.—In the genus *ramphopis* (Vieill.) the lower mandible is dilated at the base, with a horny covering produced beyond the upper. The Brazilian tanager (*R. Brasilia*, Vieill.) is a very beautiful bird, of a deep scarlet or carmine color, with brown wings and tail; bill brownish, except the base of the lower mandible, which is white.—In the genus *euphonia* (Desm.) the bill is short, broad, depressed at base, arched and keeled; wings moderate, the 1st and 2d quills longest; tail short and even. They live in small troops on the top of forest trees in tropical America, principally near rivers; they are very active and restless; there are about 30 species, the prevailing colors of which are black, blue, and yellowish. The organist tanager (*E. musica*, Desm.) is about 4 inches long, the male beautifully varied with black and orange; it is found in the West Indies, and is remarkable for the sweetness and great compass of its voice; it is very shy and difficult to obtain. The blue-headed tanager (*E. elegantissima*, Gray) is 4½ inches long; the sides of head and neck, chin, throat, and upper parts generally, are steel bluish black; top of head and semicollar behind opaque blue; beneath yellowish brown tinged with chestnut; forehead dark chestnut, margined behind with blue. It is found from northern Mexico to Guatemala, and probably in California.—In the genus *calliste* (Boie) the bill is short and slender; wings lengthened, 2d and 3d quills longest; tail short and nearly even. There are more than 30 species in the warm and damp forests of South America; they are generally seen on the tops of palm and other high trees, and are almost all richly colored. The blue-throated tanager (*C. festiva*, Boie) has the throat and crown blue; forehead and under bill and upper back black; scarlet collar, widest on sides of neck; rest of plumage parrot green; it is about 4 inches long.

TANAIS. See DON.

TANCRED, one of the heroes of the first crusade, born in 1078, died in Antioch in 1112. He was a son of the marquis Odo or Ottobonus and of Emma, a daughter of Tancred de Hauteville, and sister of the celebrated Robert Guiscard, duke of Apulia. He took the cross under his cousin Bohemond, son of Robert Guiscard, made over his heritage to his younger brother, and embarked in 1096 from Taranto. In the plains of Chalcedon his troops joined those of Godfrey of Bouillon, and with that leader he soon formed an acquaintance and an intimate friendship. At the siege of Nice in 1097 he distinguished himself by his daring, at the battle of Dorylæum saved the army of the cross from total destruction, and after the taking of Nice led the advanced guard of the crusading host through the unknown and desert countries of Asia Minor. He took possession of Tarsus and Menistra, to both of which Baldwin laid claim, giving rise to a bitter quarrel; but they were not long afterward reconciled. He achieved great distinction during the long siege of Antioch; and at the storming of Jerusalem he was with his men the first to mount the walls. In the horrible scenes of carnage and rapine which followed, he alone of the Christian knights manifested any sentiments of compassion, and at the risk of his own life he saved the lives of thousands of the captured. When the sultan of Egypt marched toward Jerusalem, Tancred defeated his advanced guard, and he shared in the subsequent victory at Ascalon, Aug. 12, 1099. He afterward took Tiberias on the sea of Gennesareth and beleaguered Jaffa, and was made prince of Tiberias or Galilee. Bohemond, now prince of Antioch, being taken prisoner by the Saracens, Tancred marched to his relief, and administered his government during his detention; and when the former after his release went to Europe to arm the West against the Byzantine empire, he left the defence of Antioch to Tancred. During his absence his principality was attacked on all sides, but was heroically defended by his kinsman, who reduced Artesia, besieged Tripoli in 1109, and subsequently withstood in Antioch a severe siege from the Saracens. Long and anxiously he awaited the arrival of Bohemond, but that prince died at Salerno, and the vast host he had collected was scattered. Tancred now resumed the offensive, defeated the Saracens, and forced the sultan to recross the Euphrates. This was his last work. His exploits have been celebrated, partly in prose, partly in verse, by Raoul de Caen, in *Les gestes de Tancrède;* but to the "Jerusalem Delivered" of Tasso is due the romantic interest which now belongs to his name. His love for Clorinda, described in that epic, is an invention of the poet.

TANEY, a S. W. co. of Missouri, bordering on Arkansas, and drained by White river and its affluents; area, 1,540 sq. m.; pop. in 1860, 3,576, of whom 82 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 301,116 bushels of Indian corn, 11,557 of wheat, 38,826 of oats, and 78,585 lbs. of butter. Capital, Forsyth.

TANEY, Roger Brooke, an American jurist, born in Calvert co., Md., March 17, 1777. He is descended from a family of English Roman Catholics which settled in Maryland about the middle of the 17th century, and received his education at Dickinson college, Penn., where he was graduated in 1795. Commencing the study of the law in Annapolis in 1796, he was admitted in 1799 to the Maryland bar, began to practise in his native county, from which he was also elected a delegate to the general assembly, and in 1801 removed to Frederic. In 1816 he was elected a state senator, and upon retiring from that office in 1822 removed to Baltimore, where he has ever since resided. In 1827 he was appointed attorney-general of Maryland, notwithstanding his political views, which were strongly democratic, were opposed to those of the governor and council; and in the summer of 1831 he was appointed by President Jackson attorney-general of the United States. Upon the dismissal of Mr. Duane from the office of secretary of the treasury, Sept. 23, 1833, on account of his refusal to remove the government deposits from the United States bank, Mr. Taney was appointed to succeed him, and immediately issued the necessary orders for the removal of the deposits to the local banks selected by him as agents of the government. The senate, which had an anti-administration majority, rejected his nomination in June, 1834, by a vote of 28 to 18. In 1835 he was nominated by President Jackson as an associate justice of the supreme court; but the senate, being still opposed to the president, postponed the subject indefinitely on the last day of the term, which was equivalent to a rejection. Upon the death of Chief Justice Marshall he was appointed by Jackson as his successor, and in March, 1836, the senate, which had meanwhile changed its political complexion, confirmed the nomination. He took his seat upon the supreme bench in Jan. 1837, and still (March, 1862) holds the office. Of the various questions before that court with which his name has been associated, that known as the "case of Dred Scott" has gained a special prominence from the important political interests which it involves. The chief justice, while concurring in the judgment of the majority of the court, that the circuit court of the United States for Missouri had no jurisdiction in the suit brought by the plaintiff in error, Dred Scott, on the ground that the latter was not a citizen of Missouri, held, that for more than a century previous to the adoption of the declaration of independence negroes, whether slaves or free, had been regarded as "beings of an inferior order, and altogether unfit to associate with the white race either in social or political relations; and so far inferior that they had no rights which the white man was bound to respect;" that consequently such persons were not included among the "people" in the general words of that instrument, and could not in any respect be considered as citizens; that the inhibition of slavery in the territories of the United States lying north of the line of 36° 30′, known as the Missouri compromise, was unconstitutional; and that Dred Scott, a negro slave, who was removed by his master from Missouri to Illinois, lost whatever freedom he may have thus acquired by being subsequently removed into the territory of Wisconsin, and by his return to the state of Missouri.

TANGENT (Lat. *tango*, to touch), in geometry, a straight line which meets or touches a curved surface without intersecting it. In trigonometry, the tangent of an arc is a perpendicular to the radius drawn from its point of meeting the arc to the secant which passes through the other extremity of this arc.

TANGIER, a town of Morocco, near the W. entrance of the strait of Gibraltar, in lat. 35° 47′ N., long. 5° 48′ W.; pop. estimated at 10,000. It is built on high ground overlooking a spacious bay, and presents a very striking appearance from the sea. It is surrounded by a wall and defended by several forts. There are several mosques and Jewish synagogues, and a Roman Catholic church. The harbor was once good and much frequented by foreign shipping, but it is now greatly incommoded by the ruins of the old mole. The principal trade of the place consists in supplying the British garrison of Gibraltar and the cities of Cadiz and Lisbon with cattle, fowls, fruit, &c.—Tangier (anc. *Tingis*, of which there are remains 3 m. to the S. E.) is supposed to have been founded by the Carthaginians, from whom it was taken by the Romans, and it afterward passed into the hands of the Goths and Arabs. The Portuguese took it in 1471, and ceded it to the British in 1662, who erected a mole and held the place for 22 years.

TANJORE, a district of British India, Madras presidency, bounded N. by South Arcot and Trichinopoly, E. and S. E. by the bay of Bengal, S. and S. W. by Madura, and W. by Poodoocottah and Trichinopoly; area, 3,781 sq. m.; pop. in 1851, 1,676,086. There are no harbors of any importance on the coast. The country is well watered by the Coleroon and Cavery and their numerous tributaries. The surface consists for the most part of an extensive plain of great fertility. Cotton goods are manufactured to a considerable extent, and salt is made in the neighborhood of Point Calymere. The inhabitants are nearly all Hindoos, and their castes and institutions have been more perfectly preserved than in most other parts of Hindostan.—Tanjore, the capital, is situated on a branch of the Cavery, 180 m. S. W. from Madras and 45 m. from the bay of

Bengal; pop. 80,000. It stands in a fertile plain, and consists of 2 forts and several suburbs. The greater fort is about 4 m. in circumference and the lesser about 1 m., and both are strong and well constructed. The palace, which stands in the centre of the great fort, is an ancient edifice with several high towers. The Hindoo temple in the small fort is considered the finest building of the kind in Hindostan. It is 570 feet long and 200 broad, and has a pyramidal tower 100 feet high. A colossal figure of a bull, carved in black granite, which surmounts the principal entrance, is a fine specimen of Indian art. The manufactures consist of silk, muslin, and cotton goods.

TANNAHILL, ROBERT, a Scottish poet, born in Paisley, June 3, 1774, died May 17, 1810. He was the son of a weaver, and throughout his life followed the same occupation. A volume of "Poems and Songs," published by him in 1807, became exceedingly popular; but while engaged upon a revised and enlarged edition, his health gave way, and he fell into a state of morbid despondency, greatly aggravated by the refusal of Constable to print the new work. He burned all his manuscript poems as well as those which had received revision, and finally drowned himself in a brook near Paisley. An enlarged edition of his poetical remains, with a memoir, was published in Glasgow in 1838.

TANNIC ACID, or TANNIN. The astringent principles existing in a great variety of plants which render them capable of combining with the skins of animals to form leather, of precipitating gelatine, of forming bluish black precipitates with the per-salts of iron (or if a free acid be present a dark green color), were formerly termed tannin. These substances, being found to possess acid properties, are now known as tannic acid, and various distinctive names are given to them as they are found of different chemical compositions, though agreeing in their essential properties. Thus the tannic acid derived from the gall nut is termed gallotannic acid; that of the oak, quercitannic acid; of the fustic (*morus tinctoria*), moritannic acid; of the cinchona, quinotannic acid, &c. The principal sources of tannin have been named in the article LEATHER, and the method of extracting it has been particularly described in the article GALL NUT, which is the most abundant source of it. Beside this variety, which is the same as that existing in the bark and leaves of many forest trees, fruit trees, and shrubs, and in some roots, as those of the tormentilla and bistort, there is another less known, as the tannin of the catechu and kino, which precipitates the salts of iron of a dark green instead of a blue color. Gallotannic acid when pure is a whitish, uncrystallizable, solid substance, without odor, intensely astringent to the taste; it dissolves freely in water, to a less extent in dilute alcohol, and sparingly in ether. It changes blue litmus paper to red, and expels carbonic acid from its compounds with effervescence. Its composition, according to Strecker, is represented by the formula $C_{54}H_{22}O_{34}$. Its aqueous solution exposed to the air absorbs oxygen, and is converted into gallic acid. Beside its use in tanning, gallotannic acid is employed to produce with the salts of iron the gallotannate of iron, which is the basis of most of the writing inks. It is also employed in medicine for its astringent property, chiefly in checking hæmorrhages, as a wash for ulcers, ophthalmic affections, &c. The combinations of tannic acid with iron and with lead have been applied in the form of ointments to the dressing of ringworms, gangrenous sores, &c.

TANNING. See LEATHER.

TANSY (*tanacetum vulgare*, Linn.), a plant formerly cultivated for its medicinal properties, but which, escaping from gardens, has established itself by the roadsides and in waste places as a hardy and troublesome weed. It belongs to the composite order, and to that section which is known as the *corymbiferæ*. The roots of the tansy are perennial, the stems dying down at the end of summer; the leaves are bipinnately divided, deep green; the flower heads in dense fastigiate corymbs, of a golden yellow color, and blooming in August and September. There are two varieties; one with variegated or striped leaves and seldom seen; the other, not uncommon, with double or curled leaves, and more in repute for its mildness, being employed in flavoring puddings, &c. The medical qualities of tansy are the aromatic, bitter, tonic, and anthelmintic, for which it is sometimes used in dyspepsia, intermittents, and gout, or for expelling worms. The young shoots are used by the Finns to dye cloths green. There are several other species, chiefly belonging to the East.

TANTALUM. See COLUMBIUM.

TANTALUS, a Greek of the mythical period, differently described as king of Argos, Corinth, Lydia, or Paphlagonia. Having given offence to the gods, he was punished in the lower world by confinement in a lake, where he was tormented with thirst, yet could not drink, for the waters always receded from his lips. Branches laden with fruit also hung over his head, and when he stretched forth his hand to take the fruit the branches withdrew. From this name the English language has acquired the verb "to tantalize."

TAOS, a N. E. co. of New Mexico, bounded N. by Colorado territory and E. by the Indian territory and Texas, and drained by the Rio Grande and Canadian rivers; area, about 18,000 sq. m.; pop. in 1860, 14,103. It is mountainous in the W., being traversed by several spurs of the Rocky mountains. The productions in 1850 were 72,049 bushels of wheat and 26,683 of Indian corn. There were 11 churches, and 40 pupils attending public schools.—TAOS, the capital, is situated on the right bank of a small tributary of the Rio Grande, 52 m. N. N. E. from Santa Fé. It stands in a valley at the foot of the first range of the Rocky mountains, and is divided into two parts by a rivulet. The inhabitants are nearly all Pueblo Indians, and are proverbial for their honesty and industry.

TAPESTRY (Gr. ταπης, a carpet), an ornamental figured cloth, made by interweaving upon a groundwork or warp of hemp or flax colored threads of worsted, silk, and sometimes gold and silver, or linen and cotton. It has been used from the earliest times for lining the walls of apartments, and sometimes for covering couches, tables, and other articles of furniture. The Greeks applied the name to coverings for the floor, mention of which is made by Homer. Such were also employed by the ancient Egyptians, made of woollen and linen and ornamented with various figures. These people, as also the Hebrews, attained great skill in ornamenting textile fabrics by embroidery. (See Embroidery.) The ornaments were formed by colored yarns worked in by the hand, and also by the loom, and in the finer specimens of the art threads of gold were introduced; and among the eastern nations the richest fabrics were studded with rubies, emeralds, diamonds, and pearls. These were hung around the inner walls of the temples, and used for lining private apartments and for the coverings of couches. The art was early introduced into France, and when Clovis in 496 adopted the Christian religion, it is stated that not only were the churches adorned with rich tapestries, but the streets themselves were curtained with them. The aid of the loom was introduced about the 9th century, but the fabrication of tapestries with the needle continued to be the chief occupation of females during a large portion of the middle ages. Up to the 12th century the use of tapestry was limited to the adornment of churches and monasteries; but after this period it began to be adopted in the dwellings of the nobility, in imitation, it is supposed, of the customs prevailing in the East, with which the crusades had made the people of the western countries familiar. The tapestry suspended in front of the walls served not merely as a protection from the cold and dampness of the stone, but it commemorated, in the designs skilfully executed by the ladies of the family, the heroic deeds of their ancestors, and was a grateful memorial to be transmitted to successive generations. In France the workmen employed in the manufacture were originally called *sarazins* and *sarazinois*, indicating the origin of the art as derived from the Saracens. The finest work in the 14th and 15th centuries was produced by the Flemings, and about this period the principal manufactories in the west of Europe were at Bruges, Antwerp, Arras (whence the name arras, generally applied to tapestry in England in the middle ages), Brussels, Lille, Tournay, and Valenciennes. Florence and Venice at that time produced tapestry more rich and costly than that made in the French cities; but in the 16th century the more ornamental work with threads of gold and silver was introduced in the celebrated manufacture of Fontainebleau. The manufacture of Gobelin tapestry established by Louis XIV. is still carried on in the greatest perfection. (See Gobelins.)—The working of tapestry was practised with much skill in England in the time of William the Conqueror. Mention is made of silken curtains embroidered in gold, and one of the most famous pieces of ancient tapestry is the Bayeux tapestry, worked with wool upon linen by Queen Matilda and her maidens, commemorating in its designs the conquest of England. This piece of work was 214 feet long and 20 inches wide, in 72 divisions, each with a Latin superscription. In former times it was exhibited once a year for a short period in church, and then locked up. Napoleon caused it to be exhibited in several of the French cities in 1803, and then transferred it to the municipality of Bayeux. (See Bayeux Tapestry.) Works of this character gradually became more common, and about the end of the reign of Henry VIII. the art of weaving tapestry is said to have been introduced into England. In the reign of James I. the manufacture was established at Mortlake in Surrey, and was sustained by the patronage of Kings James and Charles. For the earlier designs old patterns were employed, but afterward original historical and grotesque scenes were furnished in great perfection by Francis Cleyn. The tapestry hangings were arranged in the houses upon hooks, so as to hang a little out from the wall, thus admitting the concealment of a person behind them. Upon special occasions tapestry hangings were forwarded from one place to another, for temporary display.—The method of weaving tapestry in what is called the *haute-lisse* or high warp, as practised in France, has been described in the article Gobelins. This method is distinguished by the warp threads being arranged vertically in a frame, and by the weaver standing behind them while he conducts the work. By the other method, known as the *basse-lisse*, the warp threads are arranged horizontally, with the painting to be copied under them. The weaver, sitting in front of the frame, observes the pattern through the threads, which he occasionally parts with his fingers, and then depressing the treadles, he introduces the colored thread or worsted by means of a shuttle called a *flûte*, and drives the weft thus introduced close up with the teeth of a sort of comb. As the face of the work is on the under side and cannot be seen until the whole is finished, the other or *haute-lisse* is generally preferred. By either method the work is very slowly conducted. Tapestry is now woven in pieces of any desired breadth; but formerly the frames were so narrow that it was necessary to unite different breadths together, and this was done so skilfully that no imperfection was perceived in the design.

TAPEWORM. See Entozoa, vol. vii. p. 223.

TAPIOCA. See Cassava.

TAPIR (*tapirus*, Cuv.), a genus of pachyderm mammals, characterized by a nose prolonged into a short, movable proboscis; skin very thick and covered with close short hair, the neck furnished with a kind of stiff mane; tail very short; ears small, erect, and pig-like; 4 toes on the fore and 3 on the hind feet, separate and ending in nail-like hoofs; skull pyramidal as in the hog, with the nasal bones much arched for the muscles of the proboscis; teeth, 6 incisors and 2 small canines in each jaw, and molars 14 above and 12 below. The tapirs have nothing of the majestic appearance and sagacity of the elephant, and the proboscis can hardly be called a prehensile organ; they look more like hogs, but the legs are longer; they inhabit the moist tropical forests of South America and of the Malayan peninsula and archipelago, usually sleeping by day in retired places, and feeding at night on fruits, grasses, and other vegetable substances, though they are as omnivorous and gluttonous as the hog; like their congeners, they are fond of rolling in the mud and water, and are excellent swimmers; they are naturally of gentle disposition and easily tamed; when pursued they take to the water if possible, where they easily defend themselves with the teeth; on land they do not go by open paths, but break through the thick undergrowth of the woods by their powerful and wedge-like head, in this way escaping the larger carnivora; they have an acute sense of hearing and of sight, and are strong and tenacious of life; their flesh is eaten both in South America and Asia. The best known species is the American tapir (*T. Americanus*, Cuv.), about 6 feet long and 3½ high, of a uniform brown color, tinged with gray on the head and chest. It is found over almost the whole extent of South America east of the Andes, and its herds sometimes do great mischief by trampling down cultivated fields; it has only one young at a birth, and in November. The *T. villosus* (Wagl.), found upon the high Andes, differs from the preceding in having much longer hair; it is but little known, and may be a mere variety caused by a colder climate and less succulent food; it was called *T. pinchaque* by Roulin, who first described it. The Asiatic tapir (*T. Malayanus*, Horsf.) is 7 or 8 feet long, with the hind parts of the body white, and the anterior and the legs black; the trunk is 7 or 8 inches long, the eyes very small, and the rounded ears bordered with white; though the largest, it is the gentlest of the genus. Fossil species are found in the tertiary formations of central Europe; the tapir appears to be connected with the swine by the extinct *palæotherium*.

TAPPAN, David, D.D., an American clergyman, born at Manchester, Mass., April 21, 1753, died Aug. 21, 1803. He was graduated at Harvard college in 1771, and, after studying theology more than two years, commenced preaching, and in April, 1774, became pastor of a church in Newbury, Mass. In 1792 he was chosen professor of divinity in Harvard college, and held that position till his death. He published during his life about 30 occasional sermons and addresses, and in 1807 two posthumous 8vo. volumes appeared, the one containing a selection from his sermons, the other a course of lectures on Jewish antiquities.

TAPPAN, Henry Philip, D.D., LL.D., an American clergyman, born at Rhinebeck, N. Y., in the early part of the present century. He was graduated at Union college in 1825, and, after studying two years at the Auburn theological seminary, was for a year assistant pastor of the Reformed Dutch church in Schenectady. In 1828 he was settled as pastor of a Congregational church at Pittsfield, Mass.; in 1831 resigned on account of ill health and visited the West Indies; and on his return in 1832 was appointed professor of moral and intellectual philosophy in the university of the city of New York. In 1838 the faculty resigned in consequence of troubles in the institution, and for some years subsequently he conducted a private seminary, and devoted his leisure to the preparation of works on philosophy and education. In 1851, and again in 1853, he visited Europe. In 1852 he was recalled to the chair of philosophy in the New York university, but before entering upon its duties was elected chancellor of the university of Michigan, which post he accepted and still holds. In 1856 he was elected corresponding member of the imperial institute of France, and the same year president of the American association for the advancement of education. His principal works are: "Review of Edwards's Inquiry into the Freedom of the Will" (12mo., New York, 1839); "The Doctrine of the Will determined by an Appeal to Consciousness" (1840); "The Doctrine of the Will applied to Moral Agency and Responsibility" (1841); "Elements of Logic, together with an introductory Review of Philosophy in general, and a preliminary View of the Reason" (12mo., 1844; revised and enlarged ed., 1856); "Treatise on University Education" (1851); "A Step from the New World to the Old" (2 vols. 12mo., 1852); and a large number of addresses and orations.

TAR, a thick, black, viscid material, a product of the destructive distillation of carbonaceous substances, as wood, peat, bituminous coals, and shales. It is a commercial article, largely produced, and applied to a variety of uses. It was known to the ancient Greeks, and Dr. Clarke, who describes the method of manufacturing it in the forests of Bothnia, states that there is not the smallest difference between the processes there practised and those of ancient Greece. Along the whole coast of the gulf of Bothnia the inhabitants are very generally engaged in this occupation. They make use of the roots of the fir trees, with logs and billets of the same, which they arrange in a stack of conical shape, fitted to a cavity in the ground, generally made in the side of a bank. In the bottom of this cavity is placed a cast iron pan from which a spout leads out through the bank. The heap is covered over with turf, and is then fired, as in making charcoal. Tar collects in the latter part of the process of charring, and runs off through the spout into barrels placed to receive it. Tar is a product where charcoal is the chief object of the process, but is seldom obtained in quantities sufficient to render it an object to collect it, except in charring the resinous woods of the pine family. In Sweden, where the business is also an important one, some peculiar methods are adopted to increase the yield of tar in wood. Trees of no value for the saw mill are partially peeled of their bark a fathom or two up from the ground, not enough to kill them, but only to check their growth. After 5 or 6 years, when cut down, the wood is found to be much richer in resinous matters which produce tar. It is noticed that the condition of the weather during the process of charring may make a difference of 15 or 20 per cent. in the yield of tar. In the United States tar is produced in almost all parts of the country where pitch pine and the *pinus australis* are found. Along the coast of the southern states, especially of North Carolina, Virginia, and Georgia, the business has been carried on upon a large scale in connection with the manufacture of turpentine, rosin, and pitch. Old trees, which have ceased to produce turpentine, and dead wood which is rich in resinous matter, are selected for the coal pits. The process does not materially differ from that already described. The product is not only sufficient for home consumption, but large quantities are annually exported. The exports of tar and pitch for the year ending June 30, 1860, were 60,628 barrels, valued at $151,404.—In the preparation of pyroligneous acid, tar is one of the products of the destructive distillation, settling in the bottom of the tanks in which the liquids are collected. The variety known as coal tar is obtained in the same way, when bituminous matters are distilled for the production of illuminating gas or coal oils. (See Gas, and Petroleum.) Both wood and coal tars are complex mixtures of a variety of liquids holding solid matters in solution or suspension; thus, wood tar contains the hydrocarbons included in the term eupion, and toluole, xylole, cymole, naphthaline, &c., beside a number of oxidized compounds, including creosote, picamar, kapnomor, &c. Rosin and paraffine are found among its solid contents. When its volatile products have been driven off by distillation or boiling, the black carbonaceous residue is known as pitch. The composition of coal tar is not materially different; though, as sometimes the term is incorrectly applied to coal oils, it is then described as containing all the great variety of products derived from the destructive distillation of bituminous coal as obtained from the gas works. Coal tar, the commonly esteemed refuse product of these works, may be considered in general as consisting of from 3 to 15 per cent. of light oils, from 60 to 67 per cent. of heavy oils, and from 18 to 35 per cent. of pitch; the best coals, as the cannel and Boghead, produce tar more rich in light oils, and yield least pitch.—Wood tar is thick and hard in cold weather, and softens when warm so as to flow like thick molasses. Its specific gravity is about 1.04. It is applied to various useful purposes. It is boiled down to produce pitch, is used to coat the bottoms of vessels to render them water-tight, and to cover rigging of ships to preserve it from the action of the weather, and is a useful lubricant for the journals of wheels. In medicine it is used internally in chronic catarrhs, and in some cutaneous diseases, as ichthyosis. The inhalation of its vapor is recommended in cases of bronchial disease, the air of a room being impregnated with it by moderately heating the tar placed in a cup over a lamp. It has been found beneficial as an external application to ulcers and various diseases of the skin. It is administered in pills mixed with flour, or in an electuary of tar and sugar. It yields a portion of its properties to water with which it is stirred, and this preparation, known as tar water, is administered as a stimulant and diuretic, and is applied as a wash in chronic cutaneous affections.—Coal tar possesses an exceedingly repulsive odor, and was long considered of no value; but it has recently been found that the heavy oils obtained by its distillation may be made to furnish a variety of singular products possessing rare properties, and affording rich colors applicable to dyeing (see Mauve), and also flavors of various essences and agreeable perfumes. (See Carbolic Acid, Essential Oils, and Perfume.) Coal tar is now in common use as a coating for iron work exposed to the weather, and is used with asphaltum and other substances to form a tight covering for roofs and the walls of vaults, &c. Its use in preparing a fuel with the dust of mineral coal is noticed in Fuel, vol. vii. p. 782.

TAR, a river of North Carolina, which rises in Person co., and flows S. E., passing Tarborough, Greenville, and Washington, and finally discharges its waters into Pamlico sound by an estuary called Pamlico river. Its length is 140 m., or including Pamlico river 180 m., and it is navigable for small steamers to Tarborough, 85 m. from the sound.

TARANTO, or Tarento (anc. *Tarentum*), a town of S. Italy, in the province of Terra d'Otranto, situated at the N. extremity of the gulf of the same name, 44 m. W. S. W. from Brindisi; pop. about 18,000. It stands upon an island connected with the mainland by two stone bridges, is defended by a citadel, and contains many good houses and fine public edifices. The manufactures include linen and cotton goods, and gloves made from the fibres of the *pinna marina*, procured in the gulf. The purple dye of Taranto, so long celebrated, still enjoys some fame. The inner port is so choked up as to be inaccessible, while the outer one is much exposed.—Tarentum was colonized by a body of exiles from Sparta in 708 B. C.; but of its early history little is known, though it seems to have become important in consequence of the fertility of the surrounding country and the security of the harbor, which was then the best on the coast. It subsequently became a large and powerful city, and had 14 other towns subject to it. It carried on long contests with the neighboring native tribes, the Messapians and Peucetians; and in 473 B. C. its army suffered a disastrous defeat from the former, in which so many of its nobles were killed that its government, previously an aristocracy, was thereafter democratic. It afterward became predominant in the league of the Greek cities of Italy against Dionysius of Syracuse and the Lucanians. During the Samnite wars it came into collision with Rome, which declared war against it in 281. The Tarentines, as they had frequently done in former wars, looked to Greece for aid, and called in Pyrrhus, king of Epirus (see PYRRHUS), after whose defeat and withdrawal from Italy assistance was sought from Carthage by one party, while another favored submission to Rome. The latter prevailed, and the city surrendered to the consul Papirius in 272, while a Carthaginian fleet was approaching to its relief, and thereafter continued subject to Rome. During the second Punic war the citizens betrayed it into the hands of Hannibal, who held it for more than two years, with the exception of the citadel, the Roman garrison of which he was unable to subdue. In 209 Fabius Maximus retook the city and gave it up to plunder, after putting the Carthaginian garrison to the sword. It continued to be the chief town of S. Italy, though greatly decayed, under the empire, and during the middle ages shared the fate of the other cities of Magna Græcia. The present town occupies only the site of the ancient citadel, which was originally a promontory, but was made an island by Ferdinand I. of Naples, by cutting through the low isthmus to strengthen its defences.

TARANTO, DUKE OF. See MACDONALD.

TARANTULA, or TARENTULA, a terrestrial hunting or wolf spider of S. Europe, belonging to the genus *lycosa*, the *L. tarentula* (Latr.). It is the largest of European spiders, measuring 1½ to 2 inches in the length of the body; the color is ashy brown above, marked with gray on the thorax, and with triangular spots and curved streaks of black bordered with white on the abdomen; below saffron-colored, with a transverse black band. It received its popular name from being common in the vicinity of Taranto in S. Italy; it makes no web, wandering for prey, which it runs down with great swiftness, and hiding in holes in the ground and crevices lined with its silk; there is one spiracle on each side, one pulmonary sac, and 8 eyes; it is very active and fierce, and the females defend their eggs and young with self-sacrificing bravery. Its bite was once considered highly poisonous, producing the nervous febrile condition called tarantism, which was supposed to be curable only by dancing to lively music until the person fell exhausted; the extraordinary accounts of travellers in relation to the bite of this spider are mere fables, though in patients thus bitten it is well to combat the terrors of the imagination by the musical remedy which the popular belief regards as effectual. —The *L. Carolinensis* (Bosc) is called tarantula in the southern states; it attains a length of 2 inches, with an extent of legs of 4; it is mouse-colored above, with white sides and whitish dots and lines on the abdomen; below blackish; legs whitish tipped with black. It makes deep excavations in the ground, which it lines with silk; the females carry their young on the back, giving them a hideous appearance, as if covered with warts; the young run off in all directions if the mother be disturbed. Its poison is active, and might cause troublesome symptoms in man if the fangs could be opened at an angle proper to pierce his skin.

TARASCON, a town of France, department of Bouches-du-Rhône, situated on the left bank of the Rhône, 10 m. N. from Arles, and 50 m. N. N. W. from Marseilles; pop. in 1856, 19,092. It is connected with Beaucaire, on the opposite side of the river, by two bridges, one of which is one of the finest suspension bridges in France. Among the public buildings is an old castle of the counts of Provence, on a rock overhanging the river, which commands the town, built in the 15th century, and now used as a prison. The church of St. Martha is a fine Gothic edifice commenced in the 15th century, with a richly sculptured entrance and a crypt which contains several remarkable tombs and a marble statue of St. Martha, who is supposed to have introduced Christianity in the neighborhood. Silk, woollen, and cotton goods are manufactured. The railroad between Avignon and Marseilles passes through the town, and there is a branch from Tarascon to Nîmes.

TARDIGRADES. See SLOTH.

TARE (*vicia sativa*, Linn.), one of the *leguminosæ*, and when used as a green crop of great agricultural importance in certain districts of Europe. Its root is annual, its stem climbing, about 3 feet high; the leaflets of its pinnate leaves are oblong, and terminate abruptly in a small point; stipules small and toothed; flowers usually in pairs, sessile, red or purplish; pods more or less downy. There are several varieties, but the best are known as the winter tare, standing the severest weather unharmed, and the summer tare, which being tenderer must be sown in spring. The tare requires a clean rich soil, but will grow well in clayey land. It does not seem suited to the climate of the United States, though occurring occasionally by the roadside as an adventitious weed. The seeds are found to be nutritive, and can be used much in the same way as peas. There are several other species of tare or vetch found in the United States, having ornamental blue or purplish flowers. (See LENTIL.)

TARE AND TRET, allowances made by the seller of package goods which are sold by weight to the buyer, for the real or supposed weight of boxes, casks, bags, &c., and for the dust or refuse matter contained in some classes of goods. Tare is distinguished as real tare, or the exact weight of the box, cask, &c.; customary tare, or a fixed allowance for this weight, sometimes regulated by ordinance and sometimes by custom; and average tare, which is deduced from weighing a few packages, and taking their average as the allowance for the whole. In goods which can be unpacked without injury, the practice is to allow the real tare. The allowance of tret is a fixed one, being 4 lbs. for every 104 lbs. in goods which are liable to loss from dust, refuse, &c.

TARENTUM. See TARANTO.

TARGUMS (Chal. *targem*, to explain), the designation of the various Chaldee versions or paraphrases of Hebrew scriptural books, generally included in the larger rabbinical, as well as in polyglot editions of the Bible. The principal Targum is that generally, though according to most recent critics erroneously, attributed to Onkelos. (See CHALDEE LANGUAGE.)

TARIFA, a town of Spain, province of Andalusia, situated in the narrowest part of the strait of Gibraltar, on the southernmost point of the kingdom, in lat. 36° 3′ N., long. 5° 35′ W., 52 m. N. W. from Cadiz, and 25 m. S. E. from Cape Trafalgar; pop. about 12,000. It is fortified, but the walls and towers are old, and the chief defence of the place consists of a fortress upon a rocky island close to the shore. A Moorish castle stands within the walls, and is now used as a prison. There are a few manufactures.—Tarifa was named in honor of Tarif ibn Malik, a Berber chief who first landed here from Africa to reconnoitre the country; and it afterward became a frontier town of great importance. Here during the Moorish domination all vessels passing through the straits were stopped and compelled to pay duties at fixed rates; whence the word tariff in English and other languages. In 1292 Sancho el Bravo captured it, and Alonso Perez de Guzman held it against the Moors in 1294. In 1340 the Moors besieged it again, but were defeated by the kings of Castile and Portugal, and forced to retire. In 1811 it was garrisoned by 1,200 British troops and 600 Spaniards, and in December was besieged by 10,000 French troops, who were finally forced to retire with heavy loss after breaching the wall. The French captured the place in 1823 after a trifling resistance.

TARLETON, BANNASTRE, an officer of the English army during the American revolution, born in Liverpool, Aug. 21, 1754, died in Jan. 1833. He began the study of the law, but on the breaking out of the war in America entered the army, came to this country with Cornwallis with the rank of lieutenant-colonel, and received permission to raise a body of troops called the British legion. This was one of the most efficient corps the British had in the South during the war, and Tarleton, by his activity, his daring, and the celerity of his movements, contributed much to the success of the British arms in that quarter. His reputation was much stained by the massacre of Col. Buford's regiment, stationed on the Waxhaw creek, on May 29, 1780, and "Tarleton's quarter" became proverbial as a synonyme for cruelty. In the following year, at the head of 1,100 men, he attacked an inferior American force near the Cowpens under Gen. Morgan, and was badly defeated. (See COWPENS.) He was with Cornwallis during the rest of the war, and was present at the surrender of Yorktown. After his return to England he was promoted to the rank of colonel, and was so popular that in 1790 he was sent to parliament free of expense from his native town, which he represented in 3 subsequent parliaments. In the house of commons he voted generally with the opposition, supported liberal measures, and advocated the putting the officers of the navy on an equal footing with those of the army. In 1798 he married a natural daughter of the duke of Ancaster, and in 1817 received the commission of a major-general, though he never reëntered into active service. He was created a baronet, Nov. 6, 1818, and was also made a K.C.B. He published a "History of the Campaigns of 1780 and 1781 in the Southern Provinces of North America" (4to., London, 1787).

TARN, a S. department of France, in the old province of Languedoc, bounded N. and N. E. by Aveyron, S. E. by Hérault, S. by Aude, S. W. by Haute-Garonne, and N. W. by Tarn-et-Garonne; area, 2,185 sq. m.; pop. in 1862, 353,633. The S. E. part is mountainous, and the rest of the department is traversed by hills, between which there are several plains of considerable extent. The principal river is the Tarn, a tributary of the Garonne, which receives the Aveyron, Tescou, and Agout; a little way above Alby, the capital, there is a series of falls called Saut-du-Tarn. Coal, iron, lead, copper, gypsum, and porcelain and potters' clay are found. The vine is carefully cultivated, but the wines produced are of inferior quality. Woollen, cotton, and silk goods, and iron are manufactured. Capital, Albi.

TARN-ET-GARONNE, a S. department of France, in the old province of Guienne, bounded N. by Lot, E. and S. E. by Aveyron and Tarn, S. by Haute-Garonne, and S. W. and W. by Gers and Lot-et-Garonne; area, 1,435 sq. m.; pop. in 1862, 232,551. The whole department belongs to the basin of the Garonne, and the surface is generally flat, having a gradual slope to the W. The Garonne, Tarn, and Aveyron are all navigable in this department. Iron, coal, and marble are found. A large proportion of the soil is remarkably fertile. About 1/10 of the department is occupied by vineyards, and about an equal extent by forests. Great attention is paid to the breeding of mules for the Spanish market. Woollen, linen, and silk goods, cutlery, iron, and beet root sugar are manufactured. The department is intersected by many roads, and the railway between Bordeaux and Cette passes through the capital, Montauban.

TARNOW, Fanny, a German authoress, born in Güstrow, Mecklenburg-Schwerin, Dec. 17, 1783. In early life she was a governess in a noble family at Rügen, and after residing successively in Mecklenburg, St. Petersburg, and Dresden, established herself in 1828 in Weissenfels near Merseburg, Prussian Saxony, which has since been her home. Her first work, a romance entitled *Natalie*, appeared in 1804, and since that time she has been an industrious writer of imaginative literature. A selection from her works was published in 1830 in 15 vols., followed in 1840–'42 by 4 vols. of her collected tales. An anonymous romance entitled "Two Years in St. Petersburg" (1833), and containing an account of the condition of Russia during the latter part of the reign of Alexander I., is attributed to her.

TARPEIA, a Roman maiden, the daughter of Spurius Tarpeius, who was governor of the citadel on the Capitoline hill when the Sabines invested Rome. Tarpeia saw and admired the bracelets of the Sabines, and offered to betray the citadel to them for "what they wore on their left arms." She opened the gate at night, and as they passed in they threw upon her their shields, which were worn on the left arm, and crushed her. She was buried on that part of the hill thence called the Tarpeian rock.

TARQUIN. I. Lucius Tarquinius Priscus (the Elder), 5th king of Rome, assassinated in 578 B. C. According to the common story, he was the son of a Corinthian, and was born in Etruria, whence, instigated by his ambitious wife Tanaquil, he removed to Rome; but it is now believed that he belonged to a Latin family. He acquired the confidence of King Ancus Marcius, became guardian to his children, and upon the king's death seized or was elected to the vacant throne, 616 B. C. He destroyed the wealthy Sabine town of Apiolæ, and subdued the Latin towns of Cameria, Crustumerium, Medullia, Ameriola, Ficulea, Corniculum, and Nomentum. His greatest exploit was the defeat of the Sabines, who advanced to the gates of Rome, but were driven back and at length completely overthrown upon the Anio. Some authors state also that the united 12 cities of Etruria were overcome by Tarquin and compelled to submit to his authority. In the intervals of war he built the vast sewers which drained the lower part of the city, and are still perfect; laid out the Circus Maximus, and instituted the great or Roman games; assigned the rows of shops in the forum to private citizens; and began to surround the city with a stone wall, which was finished by his successor. Under Tarquin 100 new members (the *patres minorum gentium*) were added to the senate, and the number of the vestal virgins was increased from 4 to 6. His death was contrived by the sons of Ancus Marcius, who were fearful lest he should secure the succession to his son-in-law Servius Tullius. II. Lucius Tarquinius Superbus (the Proud), the 7th and last king of Rome, son of the preceding, died in 495 B. C. In 534 he formed a conspiracy, murdered Servius Tullius, and usurped the throne without any of the forms of election or the confirmation of the senate. He immediately abolished all the privileges that had been conferred upon the plebeians by Servius, decreed the death of the senators who had supported them, took the whole administration of justice into his own hands, and put to death or exiled all persons who were obnoxious to him, whether plebeians or patricians. The vacant places in the senate were not filled up, and that body was seldom consulted. But though a tyrant, he raised Rome to great power. Under him the Latin league was joined by the Hernicians and by two Volscian towns, and Rome became the head of the confederacy. With the spoils from the wealthy city of Suessa Pometia he began the erection of the capitol. He subdued Gabii, a Latin city which refused to enter into the league, and in 510 besieged Ardea. While Tarquinius Collatinus was with the army before this city, his cousin Sextus Tarquinius, the king's son, went to his house at Collatia, and there violated his wife Lucretia. Lucretia sent to the camp at Ardea and summoned thence her father and her husband. With them came Lucius Brutus. To these 3 she told what had happened, enjoined them to avenge her, and stabbed herself with a dagger. Brutus led the way into the market place, whither the corpse was carried, summoned the people, and related the occurrence. So great was the hatred already entertained of the Tarquins and the indignation now excited, that a decree was immediately passed by which the king was deposed, and his family banished from the city. Tarquin hastened to Rome, but found the gates closed against him. Brutus repaired to Ardea, where he was received with joy, and the army renounced its allegiance to the tyrant. The deposed king took refuge at Tarquinii, and thence sent ambassadors to Rome to demand his private property. While in Rome these ambassadors conspired with some young nobles for the restoration of Tarquin, but were discovered, and with their confederates—among them two sons of Brutus—were executed, and the private property of the king was given up to plunder. Tarquin now formed an alliance with the Etruscan cities of Tarquinii and Veii, and endeavored to recover the throne by force, but was defeated near the forest of Arsia. He next obtained the assistance of Lars Porsena of Clusium, who marched against Rome with a great army. (See Porsena.) Finally the whole Latin confederacy espoused the cause of Tarquin against Rome, and the contest was decided by the Roman victory in the battle of Lake Regillus, fought 498 B. C. Tarquin retired to Cumæ, and there died.

TARRAGONA, a province of Spain, in Catalonia, bounded N. by the provinces of Lerida and Barcelona, E. by the Mediterranean, S. by Castellon, and W. by Teruel; area, 1,866 sq. m.; pop. in 1857, 320,593. A great deal of the surface is mountainous, the province being traversed from N. to S. by the Prades range, which has numerous offsets that extend to the coast. The only river of importance is the Ebro. There are mines of lead, copper, silver, and manganese. The valleys are generally very fertile, and the hills are covered with forests of pine, cork, and oak. Silk, woollen, and cotton goods, &c., are extensively manufactured.—Tarragona (anc. *Tarraco*), the capital, is situated on the left bank of the Francoli, on the shore of the Mediterranean, 273 m. E. N. E. from Madrid; pop. 13,014. It consists of two parts, the high and the low, and is strongly fortified. There are in Tarragona remains of an aqueduct, an amphitheatre, and other works constructed by the Romans. The town is supposed to have been originally settled by the Phœnicians, and under the Romans it became the capital of the province of Hispania Tarraconensis, and is said to have contained 1,000,000 inhabitants. It was captured by the Goths, and in 516 was the seat of a church council. The town was destroyed by the Moors under Tarif, and remained uninhabited for 4 centuries. In the early part of the 12th century it began to be rebuilt, but did not regain its former importance. It was captured by the British in the war of succession, but they abandoned it when they got possession of Gibraltar. In 1811 the French under Suchet took it by storm.

TARRANT, a N. W. co. of Texas, intersected by the West fork of Trinity river; area, about 960 sq. m.; pop. in 1850, 664; in 1860, 6,020, including 850 slaves. The surface is undulating in part, but mostly prairie, and the soil fertile. The productions in 1850 were 66,000 bushels of Indian corn, 17,336 of potatoes, and 43,442 lbs. of butter. Capital, Birdsville.

TARRYTOWN, a village of Westchester co., N. Y., on the E. bank of the Hudson river, 27 m. by railroad from New York; pop. in 1860, 3,500. It has 6 churches, 3 academies, and a female seminary. The Hudson is here very wide, and is called Tappan Zee. Major André was captured in this neighborhood, and executed at Tappantown, on the W. side of the river.

TARSHISH, the name of an ancient commercial emporium, or, according to some critics, more than one, as the context of some of the passages of Scripture in which it is mentioned would indicate that it was W. and of others E. of Palestine. There are 25 or 30 references to it in the Scriptures. Tarsus in Cilicia, the island of Thasos in the Grecian archipelago, Tartessus in Spain, Carthage, some seaport of the British isles, and Point de Galle in Ceylon have all been urged as fulfilling certain conditions of the scriptural references. The following facts may be gleaned from the passages in which it is mentioned: It was largely engaged in commerce, and probably in ship building; the ships of Tarshish and their precious freights are often mentioned (Isa. ii. 16; xxiii. 1–14; lx. 9; lxvi. 19, &c.); it derived its name apparently from Tarshish, the grandson of Japheth, who, it is supposed, settled some of the Grecian isles or coasts, and it is several times spoken of as an island or seacoast (Gen. x. 4, 5; lx. 9; lxvi. 19); it had large traffic with Tyre and Sidon, especially in gold and silver, tin, iron, and lead (1 Kings x. 22; Jer. x. 9; Ezek. xxvii. 12); it is usually represented as W. of Palestine and of Tyre, and its ships are spoken of as broken by an E. wind (Ps. xlviii. 7). Yet we are told distinctly in 2 Chron. ix. 21, that "Solomon's ships went to Tarshish with the servants of Hiram; every 3 years once came the ships of Tarshish, bringing gold and silver, ivory, and apes, and peacocks;" and that Jehoshaphat joined with Ahaziah in building ships at Ezion-geber, a place on the Elanitic gulf of the Red sea, to go to Tarshish (2 Chron. xx. 36), while the corresponding passages in 1 Kings (ix. 26–28, x. 22, xxii. 49) state that Tarshish vessels were built at Ezion-geber and sent to Ophir, whence they brought "gold and silver," &c. This apparent discrepancy has been explained in 3 ways: 1, that the name "ships of Tarshish" does not necessarily imply that the ships were built at Tarshish or intended to ply between that and some other port, but designated a peculiar style of ships, either in the shape of the hull or rigging, as we now say an "East Indiaman," a "Baltimore clipper," &c., and that hence ships intended for a long coast voyage (to Ophir, wherever that might be) were called "ships of Tarshish" from their resemblance to the Phœnician model; 2, that the ships built at Ezion-geber (Solomon's only seaport) were taken through the canal of Sesostris (then open) into the Nile, and thence into the Mediterranean, a view which is urged by Dr. N. Davis in his work on Carthage; and 3, that there were two and possibly more places called Tarshish, the name being perhaps a generic rather than a specific one; that while one of these may have been Tartessus (which has on its side most critical authorities, among them Bochart, Michaelis, Gesenius, and Rawlinson) or Carthage, or perhaps one of the Grecian isles, the other was in the East, and most probably Point de Galle in Ceylon. This view is that of Sir J. Emerson Tennent as presented in his "Ceylon."

TARSUS, or Tarsous, a city of Asiatic Turkey, in the pashalic of Adana, situated on the right bank of the Cydnus, about 10 m. from the Mediterranean; lat. 36° 56′ N., long. 34° 59′ E.; pop. about 8,000, but during the winter months it is much greater. It stands in a fertile plain, and the houses are interspersed by gardens and orchards, and are mostly low with flat roofs, but well built of stone. The town is partly enclosed by an ancient wall supposed to have been erected by the caliph Haroun al Rashid; and there is an old castle said to have been built by Bajazet. Tarsus has an ancient Christian church, several mosques, handsome caravansaries, and public baths. The land in the vicinity is remarkably fertile, and wheat, barley, and cotton are exported, together with copper and gall nuts brought from the neighboring mountains. During the summer months the climate is unhealthy, and the inhabitants migrate in large numbers to the elevated grounds in the neighborhood.—Tarsus is a place of very great antiquity, and is said to have been founded by Sardanapalus. It was the chief city of Cilicia, was taken by Alexander, and became a military post of great importance under his successors in the East. Under the Romans it was much favored by both Augustus and Hadrian, and rose to such importance as to rival Athens, Antioch, and Alexandria in wealth, learning, and science. It was adorned with many magnificent temples, a gymnasium, and a theatre. Tarsus was the birthplace of the apostle Paul, as well as of several Greek philosophers, poets, and grammarians.

TARTAGLIA, Nicolo, an Italian mathematician, born in Brescia about 1490, died in Venice in 1557. He was left an orphan and very poor at the age of 6 years, but became the ablest geometer of his time. He taught mathematics at Verona and Vicenza, was appointed professor of mathematics at Brescia, and in 1534 was called to the same post in Venice. He discovered the method of solving the cubic equation containing the 1st and 3d powers of the unknown quantity, and in repeated contests with the ablest mathematicians of his time defeated them, being able to solve all their problems, while his own remained unsolved. In 1539 and 1540 Cardan, under the promise of strict secrecy, obtained from him his discovery, and afterward, in violation of his promise, published it in his *Ars Magna*. This led to a violent controversy and a public mathematical contest, in which Cardan being worsted, his townsmen raised a mob, and prevented a continuance of it. This solution is still known as Cardan's rule. Tartaglia published a treatise on gunnery, which has been translated into English; the first Italian translation of Euclid; and 7 or 8 other mathematical works, the best known of which is *Quesiti ed invenzioni diversi* (Venice, 1550).

TARTAR (named from Tartarus, the infernal regions, according to Paracelsus, on account of its fiery heat), also called argol, the crude bitartrate of potash, precipitated from wines as they ferment, being set free as alcohol is produced, in which it is insoluble. When purified it is known as cream of tartar. Salt of tartar is a name often given to pure carbonate of potash. Soluble tartar is a compound of boracic acid, tartaric acid, and potash, used in medicine as a purgative.—Tartar is also the name of an incrustation which collects upon the teeth, and may be broken off in hard scales. Its composition, according to Berzelius, is: salivary mucus, 13.5; animal matter soluble in muriatic acid, 7.5; phosphate of lime (earthy phosphates), 7.9.

TARTAR, Cream of. See Cream of Tartar.

TARTAR EMETIC, a double salt, consisting of tartrate of potash and tartrate of oxide of antimony. (See Antimony, vol. i. p. 660.)

TARTARIC ACID, an acid compound existing in the juice of a great variety of fruits, sometimes free, but for the most part in combination with potash or lime. It is most abundant in the juice of the grape, forming with potash the bitartrate or tartar named above. It was first separated by Scheele in 1770. The composition of the ordinary form of tartaric acid is represented by the formula $2HO, C_8H_4O_{10}$. It is a white solid, of specific gravity 1.75, crystallizing in oblique rhombic prisms, which are sometimes colorless and transparent. It is permanent in the air, very soluble in water and in alcohol. Its aqueous solution becomes mouldy when kept for some time, and is slowly converted into acetic acid. It has a strong acid taste, which is pleasant in a weak solution, and is much used in the preparation of effervescing draughts with the bicarbonates of the alkalies. Its crystals when heated become strongly electrical. Its solutions when hot exert a powerful right-handed rotation upon a ray of polarized light, a property which distinguishes this from another isomeric form of tartaric acid, in which the rotation is to the left. The two varieties also exhibit some remarkable peculiarities in their crystallization, an account of which has been given by M. Pasteur in *Annales de chimie*, (iii.) xxiv. 442, and xxviii. 56. At a temperature of 340° tartaric acid fuses, and without losing weight changes into two metameric acids, metatartaric and isotartaric; and various other modifications are produced according to the different degrees of heat to which it is subjected. Tartaric acid is distinguished from other acids by forming a white precipitate, bitartrate of potassa, when mixed with any of the potash salts, thus separating this alkali from its combination with other acids.—Tartaric acid is prepared from the crude bitartrate of potash, of which 4 parts are added to boiling water with 1 part of chalk. An insoluble tartrate of lime is precipitated, and neutral tartrate of potash remains dissolved. This is decanted, and is further decomposed by adding an equivalent of chloride of calcium, which separates the remaining tartaric acid as tartrate of lime. The precipitates are well washed and digested at a gentle heat with sulphuric acid diluted with 8 or 10 parts of water. Sulphate of lime is formed, and the tartaric acid remains in solution. After filtering, the solution is evaporated in leaden vessels to the consistence of sirup when the acid crystallizes. The process on a large scale is somewhat different. About 1,500 lbs. of washed chalk is introduced into a wooden vessel called a generator, holding about 2,000 gallons, and is thoroughly mixed with about 500 gallons of water heated by a jet of steam and stirred by an agitator. The tartar is then introduced a little at a time, till about 2 tons have been well intermixed. The carbonic acid from the decomposed chalk passes out by a pipe, and tartrate of lime is precipitated, the neutral tartrate of potash remaining in solution. Instead of using chloride of calcium to decompose the last, the cheaper sulphate of lime is employed in the state of paste. The solution, consisting of sulphate of potash, is drawn off into reservoirs, and the residue is several times washed with cold water. Sulphuric acid is then added to decompose the tartrate of lime, when the whole is run off into a leaden vessel having a perforated false bottom, and lined with twilled flannel. The liquid drains through, leaving the sulphate of lime, which is well washed, the water following the tartaric acid solution into the evaporating cisterns, where steam heat is applied through coils of lead pipe, care being taken that the temperature does not exceed 165°. The evaporation is sometimes advantageously conducted with the vacuum pan. When sufficiently condensed (to about 40° B.), the solution is drawn off into crystallizing vessels holding about 500 lbs. of the solution. In a few days, if the vessels are kept in a warm place, a crop of about 200 lbs. of crystals is obtained from each; but being colored, they are purified by redissolving and again crystallizing. The solution is purified by digesting it with bone black and filtering, when it is again concentrated and crystallized. When the residuary liquors yield no more crystals, chalk is added to take up the remaining acid as a tartrate of lime, and this is turned into the next repetition of the process. The use of a slight excess of sulphuric acid in decomposing the tartrate of lime insures the production of the finest crystals of tartaric acid. —Tartaric acid is chiefly used in medicines, and in dyeing and calico printing. In the latter it is employed to liberate chlorine from bleaching powders, so that it may produce white or "discharged" patterns on a colored ground. In medicine it is employed as a cheap substitute for citric acid or for lemonade, its solution sweetened with sugar making a pleasant cooling drink. Its use in effervescing draughts is described in the articles EFFERVESCING POWDERS and ROCHELLE SALT.—The combinations of tartaric acid with bases are numerous, and are known as tartrates. Some of the most important of them are described under the heads referred to above. The acid being bibasic has a tendency to form double salts, of which 3 varieties have been distinguished: 1, those containing protoxides only; 2, those containing sesquioxides in addition, which are combined with the same proportion of acid as the protoxide; and 3, salts analogous to tartar emetic. In general the chief value of these compounds is as medicine, though several are used in calico printing and dyeing, as the tartrate of chromium and the tartrate of potash and tin. Of the medicinal tartrates, one much used as an excellent chalybeate preparation is the tartrate of the sesquioxide of iron and potash, obtained in transparent scales of ruby red color, which dissolve readily in water. A tartrate of protoxide of iron is recommended by Dr. Ure, and is obtained by acting on clean iron filings with a solution of the acid. It is a pulverulent salt, insoluble in water, with a mild chalybeate taste.

TARTARS, or TATARS, one of the three great nomadic races which occupy the table lands of Higher Asia. The name is used with much looseness by travellers and historians, and is often applied indiscriminately to Tartars, Turks, and Tunguses; but the researches of Rémusat, Klaproth, and Ritter have fully settled the question of the race to which the name Tartar, or more properly Tatar, belongs. The annals of China about the commencement of the 9th century speak of the Ta-ta as a nomadic nation, at that time occupying a region W. of the other Mongols (for they are of the Mongolian family) near Lake Bouir-Nor, in the basin of the upper Amoor. Their nearest neighbors were the Khitans, a people of Tungus race, who were established on the northern confines of China, and appear to have been the ancestors of the Mantchoos. In 824 they were conquered by the Khitans, and were scattered; a part submitting to the Khitans, others mingling with the eastern Mongols, but the larger portion flying to the S. W. across the desert of Gobi and occupying the fertile valleys of Yu-chan around the head waters of the northern branch of the Hoang-ho or Yellow river. Here they lived in friendship with the ruling dynasty of China up to the time when the Mantchoos conquered China and established the present dynasty in that empire, and threatened them in their new quarters, when they returned reluctantly to their former home on the upper Amoor. Their compulsory migrations had made them a warlike and savage race; and possessing vast numbers of horses, they often descended upon the peaceable Chinese, and plundered their villages. The terror which they imparted to these people led them to denominate every robber horde Ta-ta or Ta-tche, and thus other Mongol tribes, Turks, and Tunguses came to receive the same name. At the commencement of the 13th century there were 4 different tribes which the Chinese named Ta-tche, viz.: 1, the White Tartars, probably a Turkish tribe, originally from the Altai mountains, and following a leader named Ala-Kouch, one of the principal chiefs of Genghis Khan, and identified by Vogel with the Ongnioud tribe of the present day; 2, the Savage Tartars, slaves of the White Tartars; 3, the Aquatic Tartars, whom Klaproth considers a Tungus tribe; and 4, the Black Tartars, the true Tartar race from whom Genghis Khan sprung. That chief is generally said to have given to the motley assemblage of tribes who followed his standard the name of Mongols, but the real name he bestowed upon them was Mog-ho (the audacious). In the new empire founded by Genghis Khan, the principal officers and his body guard alone were Tartars, while the rest of his army and people were composed of Turks, Tunguses, and other Mongol tribes. The religion of Genghis Khan, a monotheism in many particulars analogous to Parseeism, was abandoned by his grandson Batu Khan for Lamaism. About a century later the Tartar princes and their people became nominally Mohammedans, though possessing but slight knowledge of the Koran or its precepts. After the crumbling of the empire of Genghis Khan, the various nationalities of which it was composed were called by the European nations indiscriminately Tartars, though the greater part of them were really Turks. In China the last record of them is in 1604, when they are said to have been recently expelled from that empire and to have returned to their nomad habits in the desert of Gobi.—For an account of the Tartar tongues, see TURANIAN LANGUAGES.

TARTARUS, in the Grecian mythology, a son of Æther and Gæa, and the father of the giants Typhœus and Echidna. In the Iliad Tartarus is a place as far below Hades as heaven is above the earth, and there by later writers the spirits of the wicked are said to be punished. By the later poets also the name is often used synonymously with Hades.

TARTARY, or TATARY, a name applied somewhat vaguely to an extensive region of central Asia, stretching from the seas of Japan and Okhotsk on the E. to the Caspian on the W.; and some geographers even extend the term so as to include a portion of eastern Europe as far W. as the river Don. Tartary in its most extended sense therefore includes Mantchooria, Mongolia, the country of the Khalkas, Soongaria, and E. Toorkistan, all subject to China; Independent Toorkistan; all the southern part of the Russian possessions in Asia; and in Europe the greater part of the Russian governments of Orenburg, Astrakhan, Ekaterinoslav, the Cossack provinces, and the Crimea, the last of which is sometimes called Little Tartary. The name Tartary, however, is generally restricted to the region bounded N. by Siberia, E. by the seas of Okhotsk and Japan, S. by China proper, Thibet, India, Afghanistan, and Persia, and W. by the Caspian sea; while it is properly applicable to the western part only of this territory, known as Toorkistan. (See TARTARS.)

TARTINI, GIUSEPPE, an Italian composer and violinist, born at Pisano, Istria, in 1692, died in Padua in 1770. He gave up law and theology to gratify his musical propensities, and soon acquired unrivalled proficiency as a violinist. He eloped with one of his pupils, a handsome young lady belonging to a noble family, and to avoid their wrath lived for some time in concealment at Assisi, but was finally forgiven. Such was the admiration elicited by his performance that he was styled the "master of nations." Among his celebrated pupils were Pagin, La Houssaye, Pugnani, and above all Viotti. His most remarkable composition is his *Sonate du diable*, or "Tartini's Dream," which, as he related to Lalande the astronomer, he wrote on awakening from a dream in which he had heard it performed by the devil in consequence of a bargain struck with him.

TASCHEREAU, JULES ANTOINE, a French publicist and bibliographer, born in Tours, Dec. 19, 1801. At an early age he went to Paris, became a contributor to newspapers and periodicals, and published a new and full edition of Molière's works with annotations (8 vols. 8vo., 1823–'4), to which he added in 1825 his valuable *Histoire de la vie et des ouvrages de Molière; Œuvres de Boufflers* (2 vols. 8vo., 1827); *Correspondance littéraire de Grimm et de Diderot* (15 vols. 8vo., 1829–'30); and *Histoire de la vie et des ouvrages de Corneille* (8vo., 1829; new ed., 1856). After the revolution of 1830 he was appointed secretary-general of the prefecture of the Seine and master of requests in the council of state; but dissatisfied with Louis Philippe's policy, he gave up these offices at the end of a few months. He edited, in conjunction with M. de Monmerqué, the *Historiettes de Tallemant des Réaux* (6 vols. 8vo., 1833–'4), and established the *Revue rétrospective*, a periodical in which, from 1833 to 1837, he published a series of interesting historical documents, forming 20 vols. 8vo. He was a deputy from 1838 to 1842, and sat among the opposition. After the revolution of 1848 he revived his *Revue rétrospective*. In 1851 he sided with Louis Napoleon, and after the *coup d'état* was appointed assistant administrator of the imperial library, and especially charged with compiling the catalogue, of which several volumes have been printed.

TASHKEND, a town of Independent Toorkistan, situated near the junction of two small affluents of the Sir Daria or Jaxartes, 90 m. N. W. from Khokan; pop. variously estimated from 40,000 to 100,000. It stands in a fertile plain covered with numerous gardens, is surrounded by a high wall of unburned bricks 12 m. in circuit, and is entered by 12 gates. A great part of the town consists of houses surrounded by gardens and vineyards, the walls of which are so close together that only narrow lanes are left between. The houses are principally built of mud, and have a mean appearance. The residence of the khan consists of a castle defended by walls and ditches; and there are several mosques, a bazaar, numerous colleges, and old temples. The chief manufactures consist of silk and cotton goods, iron, and gunpowder. An extensive trade is carried on by means of caravans.

TASMAN, ABEL JANSSEN, a Dutch navigator, born at Hoorn about 1600, died probably on his second voyage to New Guinea and New Holland. In 1642 he was sent by Van Diemen, governor-general of the Dutch East India company, to explore the extent of the continent of New Holland. He set sail from Batavia on Aug. 14, and on Nov. 24 discovered the island to which he gave the name of the governor-general. He subsequently discovered New Zealand, the islands of the Three Kings, the archipelago of the Friendly islands, and that of the Feejee islands, and returned to Batavia after a voyage of 10 months. On Jan. 29, 1644, he undertook a second voyage along the coasts of New Guinea and New Holland, the details of which are unknown. He published a narrative of his first voyage, which was reprinted with the voyage of Coreal at Amsterdam in 1722.

TASMANIA, or Van Diemen's Land, an island and British colony off the S. E. extremity of Australia, from which it is separated by Bass's strait, between lat. 40° 45′ and 43° 35′ S. and long. 144° 50′ and 148° 20′ E.; greatest length 186 m., average breadth 165 m.; area estimated at 27,000 sq. m.; pop. in 1861, 89,977. Beside Hobarton, the capital, the principal towns are Launceston and Richmond. The shores of Tasmania, more particularly upon the S. and W. sides, are bold and rocky, but on the N. there are several sandy beaches. There are many excellent harbors, the chief of which are those of Hobarton, Launceston, Macquarrie, Port Davy, and Swansea. Brune island, which lies off the S. coast, forms with the shores of the mainland D'Entrecasteaux channel and Storm bay, in both of which there are numerous anchorages. Maria island, off the E. coast, is about 12 m. long. Schouten island, about half its length, lies N. of it. The Furneaux islands are situated at the E. entrance of Bass's strait; one of them is 40 m. long, with an average breadth of 9 m., and another is 20 m. long by 5 broad. The Kent group lies N. of the Furneaux islands, and Banks's strait, which separates the latter from Tasmania, is about 10 m. wide. All these islands, beside several smaller, are dependencies of Tasmania. Lighthouses have been erected at convenient points on them. The principal rivers of Tasmania are the Derwent, upon the estuary of which, at the head of Storm bay, the capital is built, and the N. and S. Esk, the estuary of which is called the Tamar and is navigable for large vessels to Launceston. There are several lakes, the principal of which is the great Clarence lake, about 100 m. in circuit, though only 15 m. long, situated 90 m. N. W. from Hobarton.—A great deal of the interior of the country is mountainous and rugged. The principal chain has a mean height of about 3,500 feet, with several peaks of much greater altitude, and some estimated at between 7,000 and 8,000 feet. The river valleys are exceedingly fertile, and there are elevated plains toward the interior; but a great deal of the island has been very imperfectly explored. The formation of the cliffs upon the coast and the mountains in the interior is columnar basalt, but in other places sandstone, limestone, slate, and sedimentary strata are largely developed. Coal has been found in two places, but the quality is inferior. Gold, silver, copper, and lead have all been found in small quantities, and iron ore is very abundant. The climate is much colder than that of Australia, but there is a considerable difference between the temperature at Hobarton on the S. and Launceston on the N. side of the island. In summer the average of the thermometer is 70°. All the grains cultivated in temperate regions succeed well in Tasmania; and vegetables and fruit are grown in great abundance. There are extensive forests, composed chiefly of the eucalyptus pine and acacia, much of the timber being of excellent quality for cabinet work and ship building. There are also large tracts of pasture land well adapted for cattle and sheep. The indigenous animals are chiefly marsupial, like those of Australia; one of them, peculiar to Tasmania, called the thylacine, Tasmanian wolf, or native tiger, is the largest of the Australasian carnivora. Whales, both black and spermaceti, are numerous in the adjoining seas, particularly in Bass's strait, and the fishery is prosecuted with much vigor; and seals frequent the shores and the islands in their vicinity. The fish found in the inlets and bays upon the coast are of excellent quality, and oysters are particularly abundant. All the domestic animals of Europe have been introduced, and thrive remarkably well.—The aboriginal inhabitants are almost extinct. In physical character they closely resemble those of Australia, the greatest difference being in the hair, which is woolly in the Tasmanian, while it is straight or curly in the Australian. When the colonization of Tasmania commenced, the native population was estimated at 3,000 or 4,000; and at that time the aborigines were perfectly inoffensive. But the colonists being male convicts, and no proper discipline being enforced, the natives were so aggravated by abuse that they retaliated, and a war of extermination arose. In 1849 there were only 12 men, 23 women, and 1 child remaining of unmixed blood, who were settled in comfortable dwellings near Hobarton; and in 1859 there were remaining only 5 old men and 9 old women.—In 1848 nearly a third of the population were or had been convicts; and though transportation to the island has ceased, the moral effects must long continue to be felt. Agriculture has made considerable progress. The Tasmanian wheat is of very superior quality, and 45 bushels to the acre is considered an average crop. Potatoes are cultivated largely, and exported to Australia. The principal exports are wool, whale oil and bone, provisions, different sorts of bark, and kangaroo skins. There is an excellent road 135 m. long crossing the island between Hobarton and Launceston; and steamers sail daily between the latter place and Melbourne, and at longer intervals from Hobarton to both Melbourne and Sydney. There are numerous schools both public and private. A bishop of Tasmania was appointed in 1842, whose diocese includes the island and its dependencies. There are newspapers published at the capital and Launceston. The constitution and laws are similar to those of New South Wales and the other colonies of Australia.—Tasmania was discovered by the Dutch navigator Abel Janssen Tasman in 1642, who named it Van Diemen's Land, in honor of the Dutch governor of the East Indies. Its discoverer supposed it to form a part of the mainland of Australia, as did also Cook, its next visitor, who coasted along part of its shore in 1769. Bass, in 1797, was the first to discover its separation from Australia by the strait that bears his name. The year following the island was circumnavigated by Bass and Flinders. In 1803 a detachment of soldiers with a number of convicts were sent from Sydney to take possession of the island. They formed a settlement on the E. bank of the Derwent, and in the following year Col. Collins arrived and removed the establishment to the opposite side of the river, and named the place Hobart Town (now Hobarton), in compliment to Lord Hobart, at that time the British secretary for the colonies. The same year another establishment was formed on the W. bank of the Tamar. The ports of Van Diemen's Land were first opened to foreign vessels in 1818; and the first free emigrants arrived in the colony in 1819. In 1824 Van Diemen's Land was separated from New South Wales and became an independent colony. In 1851 convict transportation to this island was abolished, and the name was officially changed to Tasmania.

TASSO, Bernardo, an Italian poet, born in Bergamo in 1493, died in Ostiglia in 1569. Having early lost his father, he was brought up by his uncle the bishop of Recanati, and after 1520 lived for several years in various cities of upper Italy. In 1525 Guido Rangone, general of the pope, took him into his service as secretary. In 1531 he became attached to Ferrante San Severino, prince of Salerno, followed him in the expedition undertaken by Charles V. against Tunis in 1534, was sent in 1537 to Spain on public business, and after returning to Naples married a young and beautiful heiress, with whom he retired to Sorrento. The prince of Salerno having, in consequence of political troubles, been declared a rebel and his estates confiscated, Tasso shared in his misfortunes, and during the remainder of his life was forced to travel from one court to another, his services ill rewarded, and forcibly separated from his wife, whom he tenderly loved. He passed to the court of the duke of Urbino, and afterward to that of the duke of Mantua, who made him governor of Ostiglia. Bernardo was the most prominent poet of his time, yet his name has been almost forgotten in the superior glory of his son. His greatest work is a heroic romance entitled *L'Amadigi*, founded on the story of Amadis de Gaul. It was written about 1540, published in 1560, and contains 100 cantos. One of the episodes detached from the main poem was expanded into a poem called *Floridante*, published after his death by his son. He wrote a large number of sonnets, odes, hymns, and lyrics, and much of his minor poetry is exceedingly beautiful. There are also a "Discourse on Poetry" and "Three Books of Letters" written by him.

TASSO, Torquato, an Italian poet, son of the preceding, born in Sorrento, March 11, 1544, died in the monastery of St. Onofrio near Rome, April 25, 1595. On his father's departure he remained with his mother, and was sent to the Jesuit school of Naples, where he applied himself with great avidity to the study of Latin, Greek, rhetoric, and poetry. In 1554 his father returned to Rome, whither Torquato was summoned, and where he pursued his studies until 1556, in which year the Spanish troops under the duke of Alva marched into the Campagna, and for safety he was sent to Bergamo. In 1557, rejoining his father at Pesaro, he attracted the favor of the duke of Urbino, who had him educated along with his own son. In May, 1559, he went to Venice, and while in that city devoted himself to the study of Dante and Petrarch, and there also imbibed that emulation of Ariosto which he says would not suffer him to sleep. His father chose for him the profession of law, and in 1560 sent him to the university of Padua, where at the end of 10 months he produced the epic poem of "Rinaldo." The news of Torquato's act was gently broken to his father, who after reading the manuscript no longer thought of opposing his son's inclinations, and with his consent the work was published at Venice in 1562. It was received throughout Italy with great favor, and its young author of 17 was everywhere called by the name of Tassino, the dear little Tasso. He now gave up the study of the law, and applied himself to poetry and philosophy. In 1562 he removed to the university of Bologna, and there conceived the idea of writing an epic poem on the crusades. Having been accused of writing satirical verses on several scholars, he was arrested and tried; and though acquitted, he resented his treatment so highly that he soon left that city. While at Correggio on the way to join his father, he received and accepted an invitation from Scipione Gonzaga to return to Padua, and become a member of the *accademia degli eterici*, which had just been founded. Here he resumed his old studies, and as a kind of preparation for his great work, he wrote his three celebrated discourses on epic poetry, which were not published until 1572. Here also he began the *Gerusalemme liberata.* Learning that the cardinal Luigi d'Este would receive him among his attendants, he went, in Oct. 1565, to Ferrara, renowned throughout Europe for the magnificence of its ducal court, and at that time more than usually brilliant with the preparations for the marriage of Alfonso d'Este with the archduchess Barbara of Austria, daughter of the emperor Ferdinand I. The departure of the cardinal for Rome on the death of Pius V. left him at liberty to follow his own inclinations, and he now made the acquaintance of the two princesses, who were destined to have so important an influence on his after life. Lucrezia d'Este was at that time 31 years old, and her sister Eleonora one year younger; but both were extremely beautiful in person, and possessed of cultivated minds. With them he soon became a favorite, and by them was made acquainted with their brother Duke Alfonso, and was admitted to his table along with the noblest courtiers. About this time he also paid court to one of the reigning beauties of Ferrara, named Lucrezia Bendedio, and on her account defended in the academy against all disputants, in the manner of the age, 50 amatory theses, with great ingenuity and ability. In Sept. 1569, he was called to the deathbed of his father, which was followed by a dangerous illness of his own. In the spring of 1570 Lucrezia d'Este was married to the duke of Urbino, and Tasso from this time, thrown more freely and constantly into the society of Eleonora, began to manifest his passion in strains which, however guarded, could not hide the character of his feelings. In the episode of Olindo and Sofronia, interwoven with the main story of the "Jerusalem Delivered," it was not hard to recognize the portraits of Eleonora and the devoted lover who feared much, hoped little, and presumed on nothing. In 1570 he followed his patron the cardinal to France, and was received with much distinction at the court of Charles IX., but lost the favor of the cardinal; and as his haughty spirit was ill calculated to brook neglect and displeasure, he abruptly returned to Rome, and there made application to the princess Eleonora and her sister to be received into the service of Alfonso. This was easily effected, and for the performance of merely nominal duties he received a pension of 15 crowns of gold a month. In the intervals of time spent in perfecting his great epic, he composed in two months his pastoral drama of *Aminta*, which was represented in 1573 at Ferrara with great magnificence. It was received throughout Italy with unbounded enthusiasm, and for several years after it was published scarcely any thing but pastoral dramas was written in that country. In 1573 he visited Pesaro at the request of the duchess of Urbino, and on his return began the tragedy of *Torrismondo;* but at the same time laboring constantly on the epic, he at length finished it in 1573. Now began those calamities which never afterward ceased to haunt his footsteps. His situation at court had for some time been made unpleasant by the intrigues and calumnies of enemies; and he determined to leave Ferrara as soon as his poem was published, sending it in the mean while to Rome to be revised by some of his friends. These critics, who judged poetry not by any rules of taste, but by mutilated quotations from Aristotle, imperfectly understood and absurdly misapplied, inflicted constant torture upon the poet by their frivolous and often contradictory objections, and by the delay of publication thus caused. Being permitted by Alfonso to make a visit to Rome, while there he received overtures to enter the service of the cardinal Ferdinand de' Medici, afterward grand duke of Tuscany, between whose house and that of Este there was a bitter enmity. Although Tasso did not accept of the offer, his consideration of it exposed him to the charge of ingratitude, and has been thought by some to have been the cause of the outrage and wrong he afterward suffered; but on his return in 1576 he was received with the same favor as of old at the court. Anxious for a pretext to leave Ferrara, he applied for the office of historiographer of the house of Este, made vacant by the death of Pigna; but, contrary to his expectations and greatly to his chagrin, his request was granted. His poem now also underwent a second and more merciless revision by ecclesiastics, who, in a poem treating of a subject so sacred, objected to the introduction of any thing relating to love or enchantment; and in order to gain any profit from his work Tasso was obliged to submit to the mutilation of these passages. In addition to the pain his quick sensibilities suffered by the revision of his poem, he found about this time that the chest in which his private papers were kept had been opened by one of the courtiers, who, Manso suspects, set in circulation the story of Tasso's secret love for Eleonora. Meeting him in the courtyard, an altercation ensued, in which the poet struck his opponent, who at that time did not resent the blow, but, having collected his brothers, attacked him shortly afterward from behind. Cowardice was not a fault of Tasso, who defended himself so vigorously as to put all the ruffians to flight. The circumstance caused him trouble, however, and his disquiet was much increased by hearing that surreptitious copies of his poem were printing in various cities of Italy. This threatened not only his pecuniary prospects, but his fame, as none but mutilated editions would necessarily be published. Although an order was procured from the pope to seize all printed copies, and to insist upon the restoration of those which had been sold, it did not suffice to remove his melancholy. He was tormented with the suspicion of the conduct of Alfonso's courtiers, apparently with too much reason, and fancied that he had been accused of heresy to the inquisition. At length, one evening in June, 1577, he is said to have run with his drawn dagger at one of the servants in the chamber of the duchess of Urbino, and in consequence was confined to his rooms by order of the duke. In regard to heresy he was examined by the inquisitor of Ferrara, who assured him that he was a good and faithful Catholic, and freely absolved him from all accusation. The duke now forbade his writing either to himself or to the duchess of Urbino; and on the night of June 20, 1577, Tasso fled from Ferrara, leaving behind him his books and manuscripts. He made his way through by-roads and lonely paths to Sorrento, where his widowed sister, whom Tasso had not met since he was a child, resided with her two children; and for nearly a year he lived happily with her in retirement.

Under the charming sky of Sorrento his health rapidly returned, and the desire of revisiting Ferrara took possession of him. To the duke and the two princesses he wrote letters entreating to be restored to favor; but no reply was returned except by Eleonora, whose answer gave no hope of success. He then went to Rome, and continued his solicitations; and an ungracious permission was finally accorded, but he was told that he must recognize the melancholy humor under which he was suffering, and allow himself to be cured by his physicians. He acceded to every thing, and returned; but his writings were retained, and he himself was treated with indignity, till at last, with hopes baffled and expectations disappointed, he a second time quitted Ferrara. After wandering from city to city, and being obliged, in order to supply his necessities, to sell the gold collar and ruby rings which had been given him in former years by the princess Lucrezia, he finally went to the court of Urbino, where he found for a time a quiet refuge; and in a letter describing his condition he uses the expression of Themistocles, that he would have been undone if he had not been ruined. But soon, suspecting danger, he suddenly left Urbino to go to the court of the duke of Savoy. At Turin he was hospitably received at the palace of the marquis Filippo d'Este, and by him introduced to Duke Charles Emanuel. Here he might have lived in security and honor; but his poem and his heart were both in Ferrara. On occasion of Alfonso's marriage with the daughter of the duke of Mantua, he set out against the advice of all his friends for the Ferrarese court, where he arrived in March, 1579, on the day before the expected coming of the new consort. No one welcomed Tasso, no one noticed him; the courtiers treated him with neglect, the servants with insolence; the duke would not see him, nor allow him to be admitted to the presence of the princesses; and his manuscripts were not given up. At last, outraged and indignant, he broke forth into bitter expressions against the duke, exclaiming that both he and his courtiers were a mean and worthless crew of thieves and ungrateful wretches. Orders were immediately given that the poet should be taken to the hospital of St Anna, where he was placed under strict guard, and treated as a pauper and a madman. This unexpected and terrible blow threw Tasso for several days into a state of stupor; and even when he recovered, the prospect of perpetual imprisonment among the hideous sights and sounds of a madhouse threatened to unsettle his mind. To the duke and the princesses he appealed for release in two beautiful poems; but the former would not and the latter could not help him. The intercessions of the emperor Rudolph, of the cardinal Albert of Austria, and of the duke of Mantua were of no avail; to all their entreaties the duke replied that it was only his intention to benefit and cure Tasso. The unhappy poet, condemned to a seemingly hopeless captivity, began to feel his mind give way. From this state he partially recovered toward the end of 1580; but about the same time his feelings were again wounded by the publication at Venice of a pirated copy of 10 cantos of the "Jerusalem Delivered" in a mutilated state. It was to no purpose that he protested against this outrage, which deprived him of all hope of profit from his works; and turning to other pursuits to drown the thoughts of his misfortunes, he wrote the "Dialogue of the Father of a Family," and made a collection of his later fugitive poems, which he dedicated to the two princesses. On Feb. 10, 1581, Eleonora died, in the 44th year of her age. Her death affected him deeply, but he made no public expression of his sorrow. Of the numerous elegies commemorating her virtues, not one was written by him. In the mean while 7 editions of his poem were published the first year, and all Italy was full of his praise. Fortunes were made by others out of the work, while the poet himself languished in prison; yet indirectly it was of benefit, as it established his fame more firmly, and caused him to be treated with less rigor; and his cell became a centre of attraction to men and women from all parts of Europe. In 1582 his *Romi* was published under the editorial supervision of Guarini. A literary controversy carried on at this period between the *accademia della crusca* and Tasso and his friends in defence of his epic resulted to the advantage of the latter, although it was the means of bringing the former into notice. But both the physical and intellectual nature of the poet now began to give way. Strange apparitions appeared to his sight, glittering lights danced before his eyes, hideous noises rang in his ears, and distressing visions disturbed his sleep. His debility finally culminated in a fever of so serious a nature that the physicians despaired of his life, and the duke of Mantua now succeeded in gaining his release on condition that Alfonso should be secured from all reprisal. In July, 1586, the poet went out of the gates of St. Anna, after a captivity of over 7 years. The reason for his imprisonment has never been known, and has been a source of perplexity to all the biographers and historians. Faustini ascribes it to the duke's desire to cure him of a fistula; Serassi to the angry words spoken by the poet on his last return to Ferrara; and Muratori declares that Tasso was flighty, not mad, and cannot divine the grounds of Alfonso's severity. These three were pensioned officers of the house of Este. Manso, Tasso's intimate friend, does not know the cause; Ginguené attributes the imprisonment to the previous attempt of the poet to abandon the service of the house of Este for that of the Medici; Black, the English biographer, ascribes it to insanity; and Tiraboschi, late librarian of Modena, denies altogether the rigid confinement, and thanks Alfonso for consulting "the honor, health, and advantage of Tasso in his retreat, who evinced his continual obstinacy by considering himself a prisoner." There is moreover an ominous erasure in all of the poet's manuscripts or copies of his manuscripts which refer to this subject. In 1832 Rosini, professor of belles-lettres in the university of Pisa, who superintended the best and most complete edition of Tasso's works, published an essay entitled *Saggio sugli amori di Torquato Tasso, e sulle cause della sua prigionia*, in which he attempted to prove, principally from the poet's own sonnets and letters, that Tasso was a favored lover of Eleonora; that to prevent the scandal which would naturally follow, he was ordered by Alfonso to pretend madness; and that when he broke all terms with the house of Este he was imprisoned. Rosini ably maintained his ground against the attacks of the partisans of the Este family, then ruling at Modena; but the question yet remains to be definitely settled. After his release, Tasso first went to the court of Mantua, and here finished in 1586 his tragedy of "Torrismondo, King of the Goths." In Naples, where he spent much of his time, he made the acquaintance of Manso, his future biographer. Everywhere throughout Italy he was held in the highest honor. A singular and striking instance of this occurred in 1592, when the company with which he was travelling from Naples to Rome stopped at Mola di Gaëta from dread of Marco di Sciarra, a bandit chieftain. As soon as the latter heard that Tasso was at Mola, he sent him his compliments, offering him a free passage and protection on the way, and assuring him that he and his followers would be proud to execute his orders. The poet declined the offer on the ground of the indelicacy of leaving his companions; whereupon Sciarra sent word that on his account he would leave the way open for himself and his friends, and the journey was accordingly made in safety. In 1593 his *Gerusalemme conquistata*, finished the year previous, was published at Rome. Though highly successful, it never rivalled the reputation of the "Jerusalem Delivered;" but Tasso always obstinately preferred this second creation of his genius to his first, and subsequently wrote the *Giudizio* ("Judgment"), to correct the taste of those who deemed the latter superior. In 1594 he was invited to Rome to receive in the capitol the laurel crown, and on Nov. 10 arrived in that city. On account of the storminess of the season, the ceremony, which was intended to surpass all former pageants, was deferred until spring. In spite of his failing health he completed during the ensuing winter his poem in blank verse entitled *Il mondo creato*, or "The Seven Days of Creation." Tasso had felt for some time that his end was drawing nigh, and in April, 1595, he was removed at his own desire to the convent of St. Onofrio. There he was seized with a violent fever, and was informed that his last hour had come. He manifested no alarm, but thanked the physician for tidings so agreeable, and returned thanks to Heaven that after a life so tempestuous he had been brought to a calm haven. The pope granted him the unusual favor of a plenary indulgence, and Tasso said that "this was the chariot upon which he hoped to go crowned, not with laurel as a poet into the capitol, but with glory as a saint to heaven." He refused to make a will, as he said he had very little to leave; and would not dictate his epitaph, as a plain stone would be sufficient to cover him. Of his friend the cardinal Cinthio Aldobrandini he earnestly begged that he would collect all the copies of his works and burn them; and the last hours of the dying man were not disturbed by a refusal to do that which was impossible. He was buried in the church of St. Onofrio, and about 13 years afterward an elegant monument was raised to his memory by the cardinal Bonifacio Bevilacqua.—The *Gerusalemme liberata* is the great epic of modern Europe. Its subject is the last campaign, under Godfrey of Bouillon, of the first crusade (1099), and its principal personages are the Christian knights Godfrey, Tancred, and Rinaldo, the female warrior Clorinda, the gentle Erminia, and the beautiful sorceress Armida. The unity of action is perfect, yet the incidents are varied and the scenes and images are almost constantly changing. The diction is graceful, and there is perhaps no other poem except the Æneid which has so few weak or tedious pages. Many instances of the false taste of the time are apparent; the supernatural machinery is too prominent; and the prevailing influence of love over the actions of the heroes has given a soft voluptuous tinge to the whole poem, which, however charming to the reader, is little in accordance with the true character of the stormy incidents and fiery knights whom the poet has attempted to portray.—The life of Tasso was early written by Manso, and forms the last volume of Rosini's edition of his works (33 vols. 8vo., Pisa, 1821–'32). Another life, written by Serassi (Rome, 1785), a partisan of the house of Este, has been followed in great measure by Black, the English biographer (2 vols. 4to., Edinburgh, 1810), especially in the denial of the story of his love for Eleonora. This was not only affirmed by Manso, but was generally believed at the time; and as early as 1593 J. Eliot in his *Orthoëpeia Gallica* said quaintly of Tasso: "This youth fell mad for the love of an Italian lass, descended of a great house, when I was in Italy." The subject is fully treated in "The Love and Madness of Tasso," by R. H. Wilde (2 vols., New York, 1841). There have been English translations of Tasso by Fairfax, Hoole, Broadhead, Hunt, and Wiffen. All his writings have not yet been published, but some hitherto unedited appeared at Lucca in 1837–'8 under the title of *Manuscritto inedito*.

TASSONI, **Alessandro**, an Italian critic and poet, born in Modena in 1565, died there in 1635. He studied law, in 1597 went to Rome and became the secretary of Cardinal Ascanio Colonna, and published in 1609 his *Conside-*

rasioni sopra il Petrarca, in which he subjected that poet to severe criticism. In 1612 he published his *Pensieri diversi.* In 1632 he was made councillor to Duke Francis I. of Este, and spent the remainder of his life at Modena. The work by which he is generally known is his mock-heroic poem *La secchia rapita*, "The Rape of the Bucket," which describes one of the petty wars waged between Modena and Bologna, when the soldiers of the former city had carried off a bucket from within one of the gates of the latter. His life has been written by Gironi and Muratori, and a selection from his letters was published at Venice in 1827.

TASTE, in philosophy. See ÆSTHETICS, and BEAUTY.

TASTE, the sense by which we distinguish the sapid properties of bodies, through the sensory apparatus situated in the mouth. Though the tongue takes the principal cognizance of gustatory sensations, the soft palate and its arches and the fauces share in this office; the papillary apparatus will be noticed under TONGUE. The nerves of taste are the lingual branch of the trifacial or 5th pair of cerebral nerves, distributed to the upper surface and front of the tongue, and the glossopharyngeal, which supplies the edges and lower surface; the latter is also regarded as the nerve by which disagreeable impressions, producing nausea and vomiting, are propagated to the medulla oblongata. These so called nerves of taste minister also to common sensation, and are excited to pain when their trunks are pressed, in which they differ from the olfactory, optic, and auditory, or the true nerves of special sense. Taste is impaired but not annihilated by section of either of these nerves, from the more or less complete destruction of the general sensation of the mucous membrane, just as division of the 5th pair affects the sensibility, secretions, and nutrition of the Schneiderian nasal membrane, with a consequent impairment of the sense of smell. A collection of vesicular matter imbedded in the medulla oblongata, regarded by Stilling as the nucleus of the glossopharyngeal nerve, and to which a part of the sensory root of the 5th pair may be traced, is considered by Carpenter as representing the gustatory ganglion. Admitting that many sensations received through the tongue (for instance, the pungent) are modifications of touch, and that many more are perceived by the nose, the general opinion of physiologists is that there are others, not appreciable to the touch or smell (like the bitter of quinine, the sweet of sugar, &c.), which are recognized only by true nerves of taste; but further investigation is necessary to show that even these last are not appreciated by the sense of touch rendered acute for this purpose. As in the case of touch, actual contact of the object with the sensitive surface is necessary, and the papillary apparatus of the tongue is essentially the same in structure as that of the skin. Sapid substances must be in solution, and at a temperature not far above or below that of the body; conditions perfectly compatible with taste (excepting what is not smell) being only a modified touch. As in touch in the blind man's fingers, taste may be educated from necessity or habit, as in the wine and tea tasters, and in epicures. Impressions on the tongue remain for a longer time than is the case with the eye, ear, and nose; the previous taking of a powerful aromatic renders easy the administration of disagreeable medicines. The sense of taste is always placed at the entrance of the alimentary canal, and its object is evidently to direct us in the choice of food, to minister to the pleasure of eating, and to excite the flow of saliva and other fluids necessary to prepare the food for digestion; as a general rule, substances agreeable to the taste are wholesome and nutritious, and *vice versa*, though there are many remarkable exceptions. Taste is often greatly depraved from habit and in disease; in many morbid conditions its promptings indicate a necessity of the system, and they should never thoughtlessly be disregarded. Of the share which belongs to the sense of smell in what is generally called taste, any one can easily convince himself by holding the nose so as to prevent the entrance of air while sapid substances are eaten; this simple experiment will surprise any one who makes it for the first time, and show him that the tongue does not perceive the flavor of bodies in the least degree; the dulness of taste in a common cold in the head, which must have been experienced by everybody, is a fact explicable in the same manner. Disease also affords remarkable proofs that taste is a compound sense, made up of a modification of touch and of smell. The common sensibility of the tongue enables us to perceive many qualities of bodies which, singly or combined, and acting on an organ highly acute naturally or by education, may produce impressions easily mistaken for those of taste proper, which perceives the flavor of substances; thus, heat and cold, consistency, form, size, chemical and mechanical actions, are perceived by the common touch of the tongue. We must admit peculiar modifications of common touch in the ends of the human fingers, in the sensitive flying membrane of the bat, and in the portions of the skin most susceptible to tickling, without any special nerves; there is no more difficulty in admitting that the tongue may be the seat of a similar modification of common touch, and that the only special nerve concerned in taste is the olfactory. Animals distinguish by the nose principally, and man by his tongue, the qualities of food fit for them, but both through the sense of smell. In this view of the sense of taste, there is no difficulty in understanding why the human tongue should be supplied by both lingual and glossopharyngeal nerves; man, savage and civilized, is liable to eat many injurious substances whose flavor, &c., may be agreeable; the lingual nerve therefore is especially acute for the rejection of substances improper in temperature, consistency, and chemical or irritating qualities; the glossopharyngeal guards the entrance to the œsophagus, and by reflex action causes the expulsion by vomiting of any thing improper which the lingual and even the olfactory may have allowed to pass. It may also be remarked that physiology furnishes no other instance of the double function of branches of a single nerve implied in the usual doctrine of common and special sense in the lingual and glossopharyngeal nerves.

TATE, Nahum, an English poet, born in Dublin in 1652, died in Southwark, Aug. 12, 1715. He was educated at the university of his native city, and went to London, where he became involved in pecuniary difficulties from which he was relieved by the earl of Dorset. After the death of Shadwell in 1692, Tate succeeded him as poet laureate. His birthday ode for George I. is considered the least miserable of his laureate productions. He died in the precincts of the mint, at that time a privileged place for debtors, and during his latter years seems to have been intemperate. He was associated with Dryden in the authorship of "Absalom and Achitophel," the 2d part of which is mostly his composition. He wrote "Memorials for the Learned, collected out of eminent Authors in History" (8vo., 1686); "Miscellanea Sacra, or Poems on Divine and Moral Subjects" (8vo., 1698); and "Panacea, a Poem on Tea" (1700). He also produced several dramatic works, among which was an alteration of "King Lear" from Shakespeare, which long held the stage to the exclusion of the original. He is however chiefly remembered by his version of the Psalms, made in conjunction with Brady, which, though itself very prosaic, soon superseded that of Sternhold and Hopkins, and is still retained in the "Book of Common Prayer." It was first published under the title of an "Essay of a New Version of the Psalms of David, consisting of the first Twenty, by N. Brady and N. Tate" (8vo., 1695). This was succeeded by "The Book of Psalms, a New Version in Metre, fitted to the Tunes used in the Churches, by N. Tate and N. Brady" (1696), with a "Supplement of Church Hymns" (1700).

TATIAN (Tatianus), a heretical writer of the 2d century, the time and place of whose birth and death are uncertain, though he calls himself a Syrian. He had travelled widely, had studied various philosophies, and had been a teacher in the pagan schools, before he went to Rome, where he became the friend and associate of Justin Martyr, through whose influence and the study of the Hebrew Scriptures he was converted to Christianity. After the death of Justin (about 165), he seems to have left Rome, returned to the East, adopted views resembling in many respects those of the principal Gnostic teachers, and became the founder of a considerable sect known as Tatianists, but who in the history of the church are confounded if not identified with the Encratites or abstinents, the Hydroparastatæ or water offerers, the Apotactics, the Saccophori, the Aquarii, the Severians, the Continentes, and others. Tatian's doctrine was Gnostic in its theory of æons and of the demiurgus or subordinate creator of the world. He seems to have taught that there was another God named Galdabaoth, the "ruler of the powers," who was father of the devil. He forbade marriage and the use of animal food and wine, substituted water for wine in the service of the eucharist, and required the giving up of worldly goods as the evidence of Christian sanctity. His only important or extensive work that remains is the "Discourse to the Greeks," or to the "Gentiles," as it is incorrectly rendered by the Latin translators, written before he became a heretic. It was regarded with favor, and classed with the works of Irenæus, Justin, and Tertullian, and has passed through many editions, the earliest being that of Zürich in 1546, and the best that of Oxford (8vo., 1700), at the end of Archdeacon Worth's edition of Justin Martyr. It has been repeatedly published in connection with the works of the other apologists, and with the excellent Latin translation of Gesner. Numerous other writings of Tatian are preserved only in the fragmentary notices of the fathers. The account of Tatian and his opinions is best given by Le Nourry in Worth's edition of his works; by the Benedictine Ceillier, in vol. ii. of his "Ecclesiastical Authors;" and by Daniel, *Tatian der Apologet* (Halle, 1837).

TATIUS, Achilles. See Achilles Tatius.

TATNALL, a S. E. co. of Georgia, bounded S. by the Altamaha, N. E. by the Cannouchee, and intersected by the Great Ohoopee river; area, about 1,200 sq. m.; pop. in 1860, 4,352, of whom 1,157 were slaves. The surface is level, and the soil sandy and not generally fertile. The productions in 1850 were 71,740 bushels of Indian corn, 46,227 of sweet potatoes, and 321 bales of cotton. There were 2 churches, and 130 pupils attending public schools. Capital, Reidville.

TATTA, a town of British India, in Sinde, situated where the Indus separates into the great E. and W. arms of its delta, 48 m. S. S. W. from Hyderabad; pop. about 10,000. It stands on ground slightly elevated by the ruins of former buildings, the remains of some of which are still visible for a distance of several miles around. During the season that the river overflows its banks the town is almost completely surrounded by water. There are some manufactures of cotton and silk goods, but the trade is not very extensive. It is supposed to be the ancient Pattala. The Portuguese plundered it in 1555, and the British established a factory there in 1758.

TATTLER, the proper name of the wading birds of the snipe family, of the division *totaneæ*, as distinguished from the *tringeæ* or sandpipers; they are often called gambets in England, and *chevaliers* in France. The bill is slender, nearly straight, about as long as the tarsus, pointed at tip, not grooved for the terminal 4th, gape extending beyond the culmen, terminal half hard and horny, and base covered with a soft skin; wings long; legs and neck elongated; toes connected anteriorly by membrane; tail almost always strongly barred. They are genuine waders, frequenting the water's edge, picking up insects, mollusks, crustaceans, worms, and other aquatic animals from the water, sand, or mud; they are found along rivers and lakes, on marshes, and on the sea shore, sometimes collecting in small companies; they are swift fliers and runners, some of the species taking readily to the water; they perform migrations of considerable extent, going north to breed in spring, and returning through the temperate regions in early autumn, at which time the flesh is fat, juicy, and much esteemed. The French name is derived from the body being mounted on long legs, and appearing as if on horseback. The nest is made on the ground, usually near water, and the young quit it as soon as hatched; in the breeding season they keep in pairs, and the families remain together until spring.—The tell-tale tattler or greater yellow-legs (*gambetta melanoleuca*, Bonap.) is about 14 inches long, 25 in alar extent, with the bill 2¼; wings long, 1st quill the longest; tail short; legs yellow and long; hind toe small. Above it is cinereous of various shades, with lines, spots, and edgings of dull white; lower back brownish black; rump and upper tail coverts white with more or less perfect brownish bands; white below, with brownish stripes on neck and bars of spots on breast; quills brownish black; tail white, with brownish black bands. This bird, sometimes called stone snipe, is found throughout temperate North America and Mexico, preferring large soft marshes and the vicinity of fresh water; it lives with other waders and the smaller ducks; the common name is derived from the habit of uttering its shrill whistle of 4 loud and rapidly repeated notes at the least sign of danger, giving the alarm to all the ducks and other game birds in the neighborhood, to the great disappointment of sportsmen; its notes are easily imitated, calling the bird within gun-shot; the flesh in autumn is excellent eating; the eggs are 4, 2¼ by 1½ inches, pale greenish yellow, with brown and purplish gray blotches. The common yellow-legs and the willet will be noticed under those titles.—The wandering tattler (*heteroscelus brevipes*, Baird) is 10½ inches long, 21 in alar extent, with tarsus 1¼, covered with hexagonal scutellæ posteriorly, and bill 1½, stout and much compressed; claws short and unusually curved; legs rough in appearance and short; hind toe ⅓ of tarsus. The color above is uniform dark plumbeous, without white marks; below white, mixed with plumbeous on neck and sides; quills dark brown. This species ranges over the islands of the Pacific and its shores from South America to Australia, and from N. E. Asia to N. W. America and Washington territory.—The solitary tattler (*rhyacophilus solitarius*, Bonap.) is 8½ inches long, 16½ in alar extent, with the bill and tarsus each 1¼; the bill is a little widened at the end, and curved slightly upward from the middle; lower half of tibiæ naked; tail moderate and rounded. It is greenish brown above, with irregularly circular ashy white spots; below white, with greenish brown lines on neck and breast and bands on sides; quills brownish black; 2 middle tail feathers like back, the others white with about 5 transverse bands of brownish black. This is distributed over temperate North America; it sometimes alights on trees, and is expert in catching dragon flies on the wing; the eggs are 1⅜ by 1 inch, greenish yellow with umber spots and patches.—The spotted tattler or peet-weet (*tringoides macularius*, Gray) is 7½ to 8 inches long, 13 in alar extent, with the bill 1 inch, and the tarsus rather less; the bill has both mandibles grooved and is tapering; lower 3d of tibiæ naked; tail much rounded; outer toe webbed to 1st joint. It is brownish olive green above, with bronzed lustre and lines and spots of brownish black; line over eyes and under parts white, the latter with circular brownish black spots; primaries, secondaries, and outer tail feathers tipped with white, the last with irregular brownish black bars. It is found over temperate North America, in Central America in winter, and also in Europe; it is one of the most common marsh birds of New England, arriving from the south about the beginning of May; it is often called "teeter" from the habit of frequently jerking the tail up and down; it does not associate with other species, nor form large flocks; it alights on branches overhanging the water, and on fences and walls; the flesh is delicious in autumn, and not at all fishy; the eggs are 1¼ by 1 inch, grayish yellow with deep brown blotches; both sexes incubate.—The buff-breasted tattler (*tryngites rufescens*, Cab.), 7½ to 8 inches long, and about 17 in alar extent, is of an ashy brown color above, with black spots on the back, and light yellowish red below; it is a handsome bird, related to the upland plover, like it frequenting dry plains; it is distributed all over North and South America, and in Europe. The last 3 species are often called sandpipers.—Among the European tattlers of the genus *totanus* (Bechst.), the largest is the greenshank (*T. glottis*, Bechst.), 12½ inches long, ashy brown above and on the sides, with the edges of the feathers spotted with brown; white below, in summer with brown spots; tail with narrow and irregular gray and white bars. It is very noisy in the breeding season, giving the alarm to all the birds within hearing, like the American tell-tale; the food consists chiefly of aquatic insects and small fishes. The American greenshank or Florida tattler (*T. [glottis] Floridanus*, Bonap.) is exceedingly like the European. The dusky tattler (*T. fuscus*, Leis.), 11 inches long, in summer is blackish brown above and slate-colored below, with the feathers edged with whitish; in winter it is ashy above, white below, and the feet reddish; it feeds chiefly on small fresh water mollusks and insects. The red shank gambet (*T. calidris*, Bechst.), 10 inches long, has the base of the bill red, and the legs yellowish red; in summer it is brown above, with black and a few white spots; white below, with brown spots on neck and breast; numerous brown and white bands on tail; in winter the spots are effaced; it breeds in Holland, where it occurs in large flocks. The wood gambet (*T. glareola*, Bechst.), 7½ inches long, is dark brown above with whitish edgings, white below, and tail with 7 or 8 blackish stripes; the legs are remarkably long; it breeds in the marshes of Europe, tripping across floating leaves with great rapidity and grace.

TATTOOING, the practice of making punctures in the body and introducing into them a pigment which will leave an indelible mark. The word has been introduced into English from the South sea islanders, and seems to be formed by reduplicating the Polynesian word *ta*, to strike. The custom, however, was known among the oriental nations, and was very common among the barbarous races of antiquity. Herodotus says that with the Thracians it marked noble birth, and the want of it low birth. It was practised by the ancient Britons, and even the Anglo-Saxons are rebuked by William of Malmesbury for this custom. It was very generally practised by the inhabitants of the South sea islands and by many of the aborigines of America. With them it was often an exceedingly painful operation, as it took months and sometimes years to complete it fully, and was extended to almost all portions of the body above the knees. In New Zealand, the higher the rank of the individual the more complicated was the pattern marked upon his face and body. Among civilized nations, soldiers and sailors sometimes tattoo themselves.

TAUCHNITZ, KARL CHRISTIAN PHILIPP, a German publisher, born in the early part of the 19th century. He is the son and successor in the business of Karl Christoph Traugott Tauchnitz, who founded at Leipsic in the latter part of the last century a printing house, long celebrated for its cheap, elegant, and accurate editions of classical authors. The son has also published many important works on philology.—CHRISTIAN BERNHARD, cousin of the preceding, founded at Leipsic in 1837 a book publishing house, from which have issued since 1842 upward of 500 volumes of a "Collection of British Authors," of a convenient size for ordinary use, and a neat typographical appearance.

TAULER, JOHANN, a German mystic and preacher, born probably at Strasbourg in 1290, died there, June 16, 1361. At the age of 18 he renounced a fortune to enter the Dominican cloister. He studied the scholastic theology in Paris; returned to Strasbourg, where he came under the influence of Master Eckhard, whose vernacular sermons then attracted thronging audiences; and he was the more impelled to mystical and fervent piety by the violence of the war between the pope John XXII. and the emperor Louis the Bavarian, when the bishop of Strasbourg forbade the clergy to open their churches. He became one of the so called "friends of God," an unorganized brotherhood, including priests, nobles, and burghers in all the large cities, who represented the height of mysticism, denied the special prerogative of the clergy except in the celebration of the sacraments, and with anti-sacerdotal tendencies dwelt upon worship in the heart and life. He preached with wonderful success in Strasbourg, and in the neighboring towns, villages, and convents, journeying to Cologne, where the mystic Ruysbroek was teaching with the greatest influence, and to Basel, where Henry of Nördlingen had resumed his forbidden functions, and where he became known to Nicholas of Basel, the leader of the "friends of God." Notwithstanding the papal interdict, and amid the ravages of the black death (1348-'9), he bestowed the consolations of religion on the forsaken people, preaching in German mingled with Latin, in churches, private assemblies, convents, and the houses of the Beguins. He published in German a treatise on "Following the Lowly Life of Christ;" addressed a remonstrance to the clergy against leaving the dying untended and unabsolved; and denounced ecclesiastical abuses while maintaining the claims of the electors. His mysticism, though it pronounced silence and suffering the most perfect work, was rather active than passive, taught explicitly the love of others, tended not to asceticism but to the amelioration of society, recommended the discharge of all ecclesiastical duties as a preparation for a higher stage of spiritual perfection, and was opposed to the pantheistic tenets of the Beguins. He had been summoned by Charles IV., when at Strasbourg in 1348, to render an account of his faith, but disappeared from the city. He returned there shortly before his death, passed his last hours in the garden of a convent where his only sister had long dwelt as a nun, and was buried in the cloisters. The best of the early editions of his sermons are those of Leipsic (1498), Basel (1521-'2), Halberstadt (1523), and Cologne (1543). There is a modern German translation by Schlosser of his sermons (3 vols., Frankfort, 1826), and of his *Nachfolge des armen Lebens Christi* (Frankfort, 1833). The hymns and treatise on German theology, which have been attributed to him, are of doubtful authenticity.—See Schmidt, *Johannes Tauler von Strasburg* (Hamburg, 1841), and Miss Winkworth, "Life and Times of Tauler," with 25 of his sermons translated from the German (London and New York, 1857).

TAUNTON, a shire town of Bristol co., Mass., situated at the head of navigation on Taunton river, 24 m. from Narranganset bay, 17 m. E. by N. from Providence, R. I., 32 m. S. from Boston, and 26 m. W. from Plymouth; pop. in 1860, 15,380. The town is in shape an irregular polygon, of which the extreme length from N. to S. is 12½ m., and from E. to W. 11 m. The surface is generally level; half of the land is wooded with forests of pine, oak, beech, and cedar, and there are 5 ponds of considerable size. It is traversed by the Taunton river and two principal branches, the Canoe and Rumford, the fall in which furnishes power for a large number of mills and factories. Three railroads pass through the town, and the navigation of the river is impeded by ice but a small part of the winter. There are 13 villages within the limits of the town, the largest of which has a population of about 8,000. The number of houses is 1,947. The assessed value of property of all kinds in 1861 was $7,937,007, of which the real estate was valued at $5,157,223, and the personal estate at $2,779,784. The amount of grain annually brought into the town is about 500,000 bushels; and 21 sloops and schooners, of 50 to 250 tons (in the aggregate 2,770 tons), ply regularly between Taunton and the principal cities on the coast. There are in the town 5 cotton factories, a flannel factory, 2 locomotive factories, 8 machine shops, 8 tack factories, 8 founderies, an iron rolling mill, nail and shovel factory, 2 britannia and silver plating factories, a screw factory, a gas factory, a paper mill, 3 factories of oiled and enamelled cloth, a sewing machine factory, 2 box and cask factories, a crucible factory, 3 factories of fire brick and stove linings and one of stone ware, a marble and monument factory, and a company for manufacturing copper, belonging to which are two large rolling mills, a kettle mill, and a roller mill; the whole employing 3,800 persons, with an aggregate capital of $2,500,000, and an annual product of $5,500,000. The Taunton copper company, the oldest and largest in the United States, has been incorporated more than 30 years. Its products are copper, sheet zinc, and yellow metal sheathing, to the amount annually of 2,500 tons, of the value of $1,250,000. Beside these larger establishments, there are numerous smaller tool shops, 7 saw mills, 5 grist mills, and 12 brick yards. Taunton has from the beginning been noted for its manufacture of brick and iron, large quantities of which are annually exported. Taunton and Taunton river are also proverbial for their herring fisheries, the privileges of which are still annually sold, though few of the inhabitants at present pursue this branch of industry. Large quantities of shad and alewives are taken from the river in April and May.—There are in Taunton 16 church buildings (4 of them of stone, and 8 of Gothic architecture), and 19 religious societies, viz.: 2 Baptist, 1 Christian, 5 Congregationalist (one of them Unitarian), 1 Episcopal, 2 Freewill Baptist, 3 Methodist, 2 Roman Catholic, 1 Spiritualist, 1 Swedenborgian, and 1 Universalist. The number of school houses is 33, in which 66 teachers are employed, and 3,000 children are instructed. The state hospital for the insane occupies a conspicuous site, with grounds of more than 140 acres, and accommodates over 400 patients. There are also in the town an academy, incorporated in 1792; 2 social libraries, with nearly 6,000 volumes; a spacious court house, with fire-proof building attached; a jail; 5 halls for public purposes; 4 hotels, one of them remarkable for its architectural elegance; 3 printing offices, publishing 1 daily and 2 weekly newspapers; 3 banks of circulation, with an aggregate capital of $1,050,000; an institution for savings; and 2 insurance offices. The streets of the central village are well laid out, lighted by gas, and adorned by shade trees of various kinds. There are many elegant private residences, some of great cost, to which are attached gardens and conservatories. Among the objects of curious interest are a grove of oaks more than 300 years old, and the singular phenomenon of an elm tree 70 feet in height growing in the centre of an aged apple tree, the trunk of which completely clasps it, both trees being in a flourishing condition.—Taunton was settled in 1638 by a company from Taunton in England, from whom a large proportion of the present natives of the town are descended. Its first minister was William Hooke, who afterward was noted in the English civil war, and was chaplain to Oliver Cromwell. In the Indian war of the sachem Philip, the town was protected from harm by the friendship of that chief for Thomas Leonard. Philip's favorite hunting ground was within the limits of the town.

TAUNTON, a town of Somersetshire, England, situated on the Tone, 46 m. S. W. from Bath and 141 m. W. S. W. from London; pop. in 1861, 14,660. It stands in a fertile valley, and is surrounded by gardens, orchards, and rich meadows. It has manufactures of silk, lace, crapes, mixed and woollen goods; and the ale of its breweries is celebrated. The trade is principally in agricultural produce, live stock, and coal, and weekly and monthly markets are held. The Taunton and Bridgewater canal and the Bristol and Exeter railway afford means of communication with other parts of the country.—Taunton is a place of great antiquity, and is supposed to have been a Roman station. In 1685 the duke of Monmouth was proclaimed king at Taunton, and the inhabitants afterward suffered from the cruelties of Jeffreys, who held his "bloody assizes" there. The town has returned 2 members to parliament since 1265.

TAUNUS MOUNTAINS. See WESTERWALD.

TAURIDA, a S. government of European Russia, lying on the Black sea and the sea of Azof; area, 24,140 sq. m.; pop. in 1858, 687,343. The government is composed of the Crimea or Tauric peninsula (anc. *Chersonesus Taurica* or *Scythica*; see CRIMEA) and the Nogai steppe. The latter, including all the territory lying N. of the Crimea to the river Dnieper and the boundary line of the government of Ekaterinoslav, is a dry elevated country, with a sandy soil impregnated with salt, and without trees, but with some rich valleys that produce luxuriant herbage. There are a few small streams which flow into the sea of Azof, but the only rivers of importance are the Dnieper on the N. W. frontier, the Konskaia on the N., and the Berda on the E. There are several lakes of considerable size, one of which covers an area of 108 sq. m., and is only separated from the sea of Azof by a sandy spit. Numerous tongues of land formed by alluvial deposits project from the S. coast, the most extensive of which lies S. of the estuary of the Dnieper, and was anciently called Achilleos Dromos, or Racecourse of Achilles. The climate is much the same as that of the Crimea. Salt, saltpetre, and naphtha are abundant. The greater part of the inhabitants are Tartars. The capital of Taurida is Simferopol, and the principal seaport and naval station is Sebastopol.

TAUROMENIUM, an ancient Greek city on the E. coast of Sicily, about half way between Messana and Catana, founded on the hill of Taurus, overlooking the sea, after the destruction of Naxos, 3 m. to the N., by Dionysius the Elder of Syracuse in 403 B. C. In 394 Dionysius unsuccessfully besieged it for a long time, but it fell into his hands in 392. In 358 Andromachus, the father of the historian Timæus, is said to have collected together all the exiled Naxians, and established them at Tauromenium. In 345 Timoleon landed here, but left Andromachus in possession of power, which he exercised mildly. Subsequently it fell into the hands of Hiero, king of Syracuse. Under the Romans it enjoyed great privileges; but during the servile war in Sicily (134–132) it was occupied and desperately defended by the insurgent slaves. By Augustus it was made a colony, and from its strong position was one of the last places taken from the Greek emperors; but in A. D. 906 it was captured by the Saracens, who destroyed it totally. The modern Taormina, a village of about 3,500 inhabitants, occupies the site of the ancient city, vestiges of which still remain.

TAURUS, a range of mountains in Asia Minor, forming the watershed between the waters flowing into the Mediterranean and those into the Black sea. It consists of two principal chains, Taurus, the higher and longer, on the S., and Anti-Taurus on the N., and with its ramifications forms on 3 sides of the peninsula, and particularly on the N. and S., a series of terraces, rising in the portion lying between Taurus and Anti-Taurus into a broad plateau abounding in salt lakes, and identical in character with the steppes of central Asia. The commencement of the chain on the W. is a disputed point, some alleging that it begins with Samsum-Dagh (anc. *Mycale*) opposite the island of Samos, while others regard it as beginning at Cape Khelidonia, near the gulf of Adalia. It follows and repeats the sinuosities of the coast, and in crossing the ancient province of Pamphylia takes the name of Takhtali-Dagh, attaining an elevation of nearly 7,000 feet; in the ancient Pisidia and Isauria it is called Gok-Dagh; in the ancient Lycaonia and Cilicia, where it rises to the height of 10,000 feet, it is called Ara-Dagh, Bulghur-Dagh, and Ala-Dagh; toward the source of the Jyhoon (anc. *Pyramus*), it throws off a spur toward the S. under the name of Giaur-Dagh, which, meeting further E. the Akma-Dagh, forms the celebrated defile anciently known as the Amanian gates; the main chain, trending N. E. under the name of Akar-Dagh, crosses the Euphrates, separates its E. branch from the sources of the Tigris, and joins near Bayazid the Armenian system of mountains. Anti-Taurus, separating from the Taurine plateau at the N. of Cilicia, rises in the lofty peak of Mt. Arjish (anc. *Argæus*) to the height of 13,000 feet; it then divides into two branches, one extending eastward across the Euphrates to the Caucasian mountains; the other turns westward, and, under the name of Hassan-Dagh, Sultan-Dagh, or Nurad-Dagh, terminates near Broussa, in the ancient Olympus, about 5,200 feet in height. Numerous geographers, however, apply the name Anti-Taurus to the eastern branch alone. A branch of this chain follows the S. coast of the Black sea as far as Trebizond, and forms the N. boundary of the great triangular plateau of upper Asia Minor. Strabo, Eratosthenes, Dicæarchus, and other ancient geographers applied the name Taurus to a continuation of this range eastward across the Asiatic continent, which they erroneously believed to follow the same parallel to the E. shores of China.

TAUTOG. See Blackfish.

TAVERNIER, Jean Baptiste, a French traveller and merchant, born in Paris in 1605, died in Moscow in July, 1689. His father was a map engraver from Antwerp, and the son learned the jeweller's trade, and before his 22d year had traversed France, England, the Low Countries, Germany, Switzerland, Poland, Hungary, and Italy, serving at different times as page or general attendant in noble families and as a soldier. In 1630 he accompanied two young French noblemen to Palestine, and thence extended his travels to Ispahan, and returned in 1633 to France, where he was appointed comptroller of the household of the duke of Orleans. In 1638 he started again for the East, and between 1630 and 1679 made 6 journeys into Asia, traversing Turkey in Europe and Asia, Persia, Independent Tartary, Cabool, India, Further India, Malacca, Sumatra, and most of the Dutch East India possessions, and penetrating to the confines of China. On his return from his 6th journey, enriched by his traffic in diamonds and other rare oriental products, he was ennobled by Louis XIV., purchased the estate of Aubonne upon the shores of Lake Geneva, assumed the title of Baron d'Aubonne, and lived in princely style, employing a writer named Chappuzeau to prepare a narrative of his travels. The frauds of his nephew, who had the management of his affairs, obliging him to sell his estate, he removed to Berlin, and was nominated by the elector of Brandenburg director of a new East India company. In 1688 he set out for the East Indies by way of Russia, but was seized with fatal illness at Moscow. The accounts of his travels are contained in *Nouvelle relation de l'intérieur du sérail* (4to., 1675), and *Les six voyages de Jean Baptiste Tavernier, écuyer, baron d'Aubonne, en Turquie, en Perse et aux Indes* (3 vols. 4to., 1676–'9). They were translated into English (fol., London, 1677).

TAXES (Lat. *taxo*, to rate or value; Gr. *τασσω*, to arrange), the contributions paid by the inhabitants of a country for the use of the government. In a free government taxes are laid by the representatives of the people, and of course with the consent of those who are to pay them; in despotic governments they are levied at the will of the ruling power. Taxes are usually divided into direct and indirect; the former include all assessments made upon the real or personal estate of the taxpayer, upon his income, or upon his head; the latter comprise duties upon imports and exports, excises, licenses, stamp duties, and the like. Taxation in some form is of very ancient origin. Among the Hebrews, in the time of the theocracy, there was a capitation tax of a half shekel (about 30 cts.) payable by every male in the nation; a tribute of the first fruits, and of the first born of their domestic animals, which might however be commuted for money at a fixed rate; a redemption tax for the first born male of the family; and a first and second tithe for the support of the Levites and of the service of the tabernacle, and every third year a third tithe for the benefit of the poor, and so in some sense a poor rate. After they adopted the regal form of government, the taxes were greatly increased. In addition to the exaction of a tithe of all the property, not of the income alone, the kings exacted a tithe of personal service of both sexes, or its equivalent in money, and occasionally, in addition to this, a heavy capitation tax (2 Kings xv. 20), or a special assessment. There were also, at least in the later periods of Jewish history, taxes levied upon houses, and transit taxes and tariffs on the introduction of foreign merchandise. Presents also formed with the Jewish, as with most oriental monarchs, a species of voluntary contribution of considerable amount. Solomon was successful in collecting a large revenue; and the stoning to death of Adoram, "who was over the tribute," and the secession of the 10 tribes at the commencement of the reign of his son and successor, indicate how oppressive had been the taxation which caused such an alienation of feeling from the popular dynasty of David.—In the Athenian republic there were no direct taxes, either on personal or real estate; the sources of revenue were the lands of the republic, fines and confiscations, the royalty of $\frac{1}{24}$ of the products of the mines, a capitation tax on freedmen and foreigners resident in the republic, customs duties on foreign commodities and merchandise, on which a tariff of 2 per cent. was levied, some excise duties, licenses of markets and houses of prostitution, and tribute paid by other cities and islands subjected to their sway. The imposts, licenses, &c., were generally farmed to companies, which gave security for their prompt payment. In times of war, extraordinary contributions were levied on wealthy citizens, or an appeal was made to their patriotism. The common people, so far from paying any tax, except the duty on the goods they purchased, received from the state large appropriations for public games and spectacles. In Rome, under the republic, the spoils of conquered nations and the annual tribute exacted from them defrayed the greater part of the expenses of the state; but under the empire it was found necessary to resort to numerous devices of taxation to replenish the often exhausted treasury of the emperors; portions of the territorial revenues were sequestrated, capitation taxes levied, tolls, taxes on corn, and legacy and hereditary duties collected, heavy sums exacted for the privilege of Roman citizenship, &c. During the middle ages, under the feudal system, there was no system of taxation. The kings were maintained by the products of their land, and in case of war their vassals, the barons and knights, were under obligation to furnish their quota of men-at-arms equipped and provisioned without expense to the monarch; and this military service was performed by their tenants by way of rental for the lands they cultivated. The first approach to modern systems of taxation was made during the middle ages by the republic of Venice, which, being largely engaged in commerce and holding colonial possessions in Greece and elsewhere, was obliged to maintain a large army and navy, to defend its fleets and colonies from the Turks, and to maintain its aristocracy. To meet these expenses, a direct and an indirect tax were levied, the former on the lands of the republic, the latter in the form of duties on the goods manufactured and the merchandise imported; these duties, which brought in a large revenue, were imposed on the necessaries as well as the luxuries of life; salt, flour, oil, spices, food of all sorts, wine, soap, silks, jewelry, were all taxed heavily. In France, prior to the revolution, though Sully and Colbert were both eminent as financiers, and did much to put the finances of the kingdom in a prosperous condition, there was a serious obstacle to any equitable system of taxation in the fact that the nobility and clergy, the privileged classes as they were termed, were exempted from its burdens, which rested necessarily with crushing weight on the *bourgeois* and *ouvriers;* and to add to their distress, most of the taxes were farmed, often to men who exacted much more than the legal amount. In England the finances for centuries were badly managed; there was little encouragement to industry, and the taxes, whether direct or indirect, were insufficient for the expenses of the government. The privileged classes were exempted as in France. Resort was often had to the sale of monopolies, and to forced loans, contributions, and confiscations, to procure the means of gratifying the monarch's extravagance, or the revenue necessary for conducting wars. In most of the other countries of Europe there were no taxes levied on the clergy or the nobles. In the countries of western Asia, the government with the right of taxation of provinces was bestowed on favorites, or sold to the man who would pay highest for it; and as the duration of the government of these rulers was short, they practised the most cruel extortion upon their unfortunate subjects, completely annihilating industry, and often transforming countries once prosperous and populous into desert wastes, by their oppressions.—It is only within the last 100 years that the best methods of taxation have come to be understood, and the possibility of collecting such sums as are necessary for the maintenance even of a costly government, without impairing the prosperity of the people who are taxed, comprehended. Sir Robert Walpole was one of the earliest statesmen to perceive the advantages of the excise tax over direct taxation on land or polls; but the violent opposition which his "excise scheme" elicited compelled its postponement. Adam Smith laid down the maxims of taxation, as follows: "1. The subjects of every state ought to contribute toward the support of the government, as nearly as possible, in proportion to their respective abilities; that is, in proportion to the revenue which they respectively enjoy under the protection of the state. 2. The tax which each individual is bound to pay ought to be certain, and not arbitrary; the time of payment, the manner of payment, and the quantity to be paid, ought all to be clear and plain to the contributor and to every other person. 3. Every tax ought to be levied at the time, and in the manner, in which it is most likely to be convenient for the contributor to pay it. 4. Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state." The taxes of most of the nations of Europe prior to the present century were so levied as to violate nearly all of these maxims. In 1598, according to Sully, out of 150,000,000 livres drawn from the people of France by taxation, only 30,000,000 found its way into the public treasury. As late as the administration of M. Necker, the cost of collecting the taxes was 10⅔ per cent. In 1857 the tax of the United Kingdom, amounting to about £80,000,000, was collected at a cost of 4 per cent., and of this the collection in Ireland was the larger part. The farming of taxes, once very generally practised, is now for the most part relinquished, but in Turkey a part of them are still farmed. The necessities of Great Britain and France, growing out of their protracted wars and large debts, have compelled a resort to heavy taxation, and the exercise of great financial skill in so distributing the taxes as to make their burden tolerable. In Great Britain a heavy tariff is laid upon those foreign goods which compete with British manufactures, and a moderate but productive one on imported articles of general necessity like tea and coffee, foreign paper, &c., while wine and tobacco are heavily assessed. Excise duties are laid on distilled and malt liquors of British manufacture, as well as on domestic produce. Licenses are required for the sale of spirituous liquors, and the keeping of inns, post horses, hackney carriages, stage coaches, railways, &c. Newspapers were subjected to a compulsory stamp duty till 1855; it is now optional, and if paid exempts the paper from postage. All official and legal documents must be executed on stamped paper; duties are also collected on bills of exchange and bankers' notes; the probate of wills and taking out of letters of administration are charged with duties proportional to the amount of personal property, from 2½ to 3 per cent. being charged the heirs when there is a will, and from 3½ to 4½ per cent. where letters of administration are issued. Lands, houses, servants, horses, carriages, dogs, watches, and jewels are taxed; and there are beside taxes on income, and revenues from the post office, crown lands, timber, &c. The customs and excise duties ordinarily constitute about $\frac{4}{7}$ of the entire revenue, and the income tax nearly ⅙ and stamps ⅛ of the national tax, which usually amounts to about £72,000,000; and the local taxes, tithes, poor rates, &c., amount to £20,000,000 more. The total budget of France for the present year (1862) is 1,974,070,028 francs, of which nearly ¼ is the product of direct taxes, ⅕ customs and salt duties, ¼ excise and other indirect taxes, while the capitation tax, stamp duties, crown lands, and assessments on forests and fisheries, amount to about ⅕ of the whole. Of the revenues of Great Britain £28,000,000 is paid annually as interest on the national debt, and of those of France in 1862, 602,215,602 francs.—In the United States, the national government has levied a direct tax only in 3 instances, and never for a sum exceeding $6,000,000, until 1861; the customs and occasionally excise revenues and the receipts for the public lands having been sufficient to defray the expenses of the government, and to liquidate a portion of the debt. The enormous expenditures of the existing civil war (1861-'2), and the reduced receipts from customs, have compelled the levying of a direct tax intended to be sufficient to pay the interest of the debt, and to furnish a sinking fund to extinguish the principal. At the extra session of congress on Aug. 6, 1861, a bill was passed levying a direct tax of $20,000,000, partly on lands and partly on incomes; the duties on imports from foreign countries were also increased. The direct tax, which was to be assessed in the spring of 1862, has been generally assumed by the states themselves. During the present session (1861-'2) of congress, the necessity of raising a large revenue has led to the consideration of various plans of taxation. An elaborate bill, providing for excise duties on all kinds of manufactures, tolls on all passenger travel, duties on plate, watches, &c., licenses from all classes of dealers, a tax on incomes over $600, legacy and succession duties, and stamps on all kinds of legal and commercial papers, patent medicines, telegrams, &c., passed the house of representatives by a large majority, and is now (May, 1862) under consideration in the senate, where it has been materially modified. Other plans, embracing entirely different principles, are also maturing, and may be substituted for that now pending. The several states, being debarred by the constitution from collecting duties on imports, have raised the revenues necessary for their state expenditures by direct taxes on lands, houses, and personal property; specific taxes on banking and insurance capital, railroads, and turnpikes; bonuses from banks, &c.; licenses on auctions, peddlers, public houses, the retailing of spirituous liquors, gunpowder, &c.; and in most of the states by capitation taxes. A part of the state taxes are still payable in labor in some of the states, though the amount thus paid is now mostly confined to highway taxes, and to the frontier states, where money is less abundant than labor. No state has hitherto levied a general income tax, though in some cases particular professions have been assessed, nor any except Virginia and Pennsylvania an inheritance tax. Maryland and New Jersey collect a transit tax from the railroad companies for all passengers over certain roads. The following table gives the direct and indirect tax of each state government in the United States for state purposes, together with the state valuations, in most cases for 1860:

Taxes and Valuations of the States, 1860.

States.	Federal population.	Valuation.	Tax.
Maine	628,276	$190,211,600	$286,852
New Hampshire	326,072	156,310,860	181,826
Vermont	315,116	122,477,170	155,082
Massachusetts	1,231,065	815,237,433	948,912
Rhode Island	174,621	135,337,588	150,405
Connecticut	460,151	444,274,114	224,914
New York	3,880,727	1,843,338,517	3,512 487
New Jersey	672,031	467,918,324	170,889
Pennsylvania	2,906,370	1,416,501,818	3,210,752
Delaware	111,498	46,242,181	28,000
Maryland	652,158	376,919,944	872,874
Virginia	1,399,731	793,249,681	3,120,922
North Carolina	860,234	358,739,399	688,508
South Carolina	542,795	548,138,754	635,525
Georgia	872,436	645,895,237	426,000
Florida	115,737	73,101,500	62,719
Alabama	790,243	495,237,078	781,068
Mississippi	616,717	607,324,911	453,918
Louisiana	576,086	602,118,568	988,701
Texas	580,159	365,200,614	309,727
Arkansas	390,985	219,256,473	204,161
Tennessee	999,583	493,903,892	1,282,964
Kentucky	1,065,517	666,043,112	920,851
Ohio	2,339,599	1,193,898,422	3,115,208
Michigan	749,112	257,163,983	692,482
Indiana	1,350,941	528,835,371	2,690,824
Illinois	1,711,758	871,860,282	750,580
Missouri	1,136,331	501,214,398	921,756
Kansas	107,110	31,327,895	....
Iowa	674,948	$247,338,265	$296,735
Wisconsin	775,873	273,671,668	399,996
Minnesota	172,022	52,294,418	177,822
California	380,016	207,874,613	1,066,628
Oregon	52,464	28,930,687	49,868
District of Columbia	78,804	41,084,945	....
Total	29,568,427	16,118,478,660	29,667,851

Beside the state taxes, there are also in all the states county, town, and road taxes, and in most of them school and municipal taxes, the whole amount of which it is impossible to ascertain. In the states which include large cities they are often of great amount. In New York the local taxes in 1860 were $12,840,814, of which $9,863,002 was in the county of New York. In Ohio in 1859 the local taxation was $6,618,843. It would not probably be far from the truth to estimate it at 3 times the amount of the state taxes. It is almost an invariable provision of the state constitutions that no taxes can be levied on any pretence without the consent of the people or their representatives; that they shall be levied and collected only for public purposes; and that all revenue bills shall originate in the lower house of the legislature. Further safeguards are raised against the power of taxation by provisions that no money shall be drawn from the treasury except in compliance with appropriations made by law, and that there shall be an annual report of income and expenditure. In all the states the property of the federal government is by law specially exempted from taxation, as are also usually churches, benevolent institutions, colleges, academies, school houses, and the funds of charitable and scientific societies, and places and rights of burial. The only exemption of classes from taxation are clergymen to a certain limit in some of the states, paupers in all, and Indians and negroes in those northern states in which they have no vote. In the New England states, aliens who are likely to become chargeable to the town, or whose families are in danger of becoming paupers, are not suffered to acquire a residence, and thereby a right to public relief, their taxes being remitted by the town authorities to prevent it. The assessors in the several jurisdictions of the states are generally required to prepare assessment rolls, in which shall be set forth the names of all taxable inhabitants, the quantity and value of land or the house or houses taxed to each person, and the value of all personal property. Usually farming lands and dwellings are set in the assessment rolls at less than their value, as yielding a smaller percentage of income than most descriptions of personal property. These assessment rolls, when delivered to the collector, constitute his authority for the collection of the taxes.—The following are a few of the points relative to taxation which have been settled by our highest courts. The tax must be levied in all cases by the tribunal or body of persons to whom the power is delegated.

The levy of a tax by a town meeting, not called according to the prescribed form, is illegal and void. When a statute requires a list to be delivered to the collector on or before a given day, a delivery either before or after that day confers no authority on him to collect the tax. As a tax for an illegal purpose is void, the object of each assessment ought to be so designated that a citizen may resist payment of any one which is illegal; thus state, county, and town taxes should be separately designated, since one may be lawfully levied and another not so. In all respects the requirement and direction of statutes concerning taxes must be carefully observed. The policy of the law is to throw around the property of the citizen the most complete possible protection, and the tax must not only be right and just in itself, but it must be levied in all respects in conformity to law, or the taxpayer is justified in resisting its collection. The measures to compel the collection of taxes properly levied are generally similar in the several states. The tax if paid at an early date is reduced by a small percentage for prompt payment; if not paid by a certain time, it is increased by the interest; after a further period, interest is reckoned at 12 per cent. or more; after another delay, if real estate, it is sold for the taxes, though an opportunity of redemption is given for 2 or 3 years; if personal estate, a distress of personal property is made, and fines and costs added; and in some states imprisonment is added to the penalties.

TAXIDERMY (Gr. ταξις, arrangement, and δερμα, skin), a term originally used to designate the methods of preserving skins, so as to retain their natural appearance; but it is now applied to the art of preserving the whole animal body for collections of natural history. The art has been recently brought to a high state of perfection. By the methods now in use small animals are immersed in alcohol, the strength of which should be adapted to the particular object to be preserved, as very strong alcohol may destroy the colors, and injuriously harden the integuments. Tartar emetic or corrosive sublimate added to it increases its preserving quality and prevents its use for other purposes. A special preparation known as Goadby's aluminous solution is sometimes employed, composed of rock salt 4 oz., alum 2 oz., corrosive sublimate 4 gr., boiling water 2 quarts; and another known as his saline solution is composed of rock salt 8 oz., corrosive sublimate 2 gr., boiling water 1 quart. A solution of corrosive sublimate may be employed, or of common salt, and even oil may be resorted to, when more suitable materials are wanting. The object to be preserved should be suspended in the liquid, without contact with the sides or bottom of the vessel; and after remaining for some time the liquid should be changed, but that used first may be kept to be again employed in the same way. It is recommended to employ, instead of glass jars, square copper cans or wooden kegs made with a large mouth, with a cap or bung fitting air-tight, and to put the smaller specimens in porous bags before introducing them into the liquid. It is well also to wrap each one of them in cotton; and the vessel must in all cases be completely filled to prevent injury by motion. Specimens of considerable size should have incisions in the abdomen, that the alcohol may more readily reach the internal parts, and injections of alcohol may also be made. This method of preservation is applicable to all the small quadrupeds, reptiles, crustacea, fishes, most of the insects (excepting the lepidoptera), the skins of the larger animals, &c. Insects are often preserved by fastening them down with pins thrust through their bodies into a lining of cork or soft wood forming the bottom of paper boxes. They may, as collected, be put into small vials with wide mouths, containing a little camphor, or, still better, a sponge soaked in ether, which soon kills them. The larger animals are skinned, and the skins are put into alcohol, or coated on the inside with arsenic and then dried; but if arsenic cannot be had, salt may be used, and immersion in a strong brine of alum and salt is very efficacious. Insects are kept from the skins by sprinkling in the hair powdered green or blue vitriol. The skins are taken off with especial care to retain the form, leaving the bones of the toes, and also the skulls of the smaller animals. The skeletons may be separately prepared and preserved, to be afterward set up in their natural position with wires. All parts liable to decompose are carefully removed, and arsenic or arsenical soap is applied wherever decomposition may be feared. The arsenic may be applied either in a state of dry powder to the moist skin, or mixed with alcohol and water to the consistency of molasses and put on with a brush. The preparation of the skins of birds is a matter of much delicacy. When the bird is killed with shot, the holes should be immediately stopped with cotton, as also the mouth and nostrils; and if the bird is small it should be thrust head foremost into a cone of paper prepared for the purpose, the open end of which should be folded down. If any of the feathers have been crumpled or bent, they may be partially restored by dipping them into hot water. Before removing the skin, the principal dimensions of the bird are to be carefully noted, so that they may be retained. The skinning, which proceeds from an incision extending back from the lower end of the breast bone, is made with especial care to avoid soiling the feathers. As the skin is loosened cotton is inserted to prevent its adhering to the body; and the legs are in succession stripped of their covering through the single incision made, and are cut off with the scissors or a knife at one of the lower joints, leaving the feet attached to the skin. The tail is in like manner separated by cutting through the last joint of the vertebræ. The body is then suspended by a hook introduced into the lower part of the back or rump, and the skin is inverted and carefully loosened. Before reaching the wings, they are somewhat softened by stretching and pulling, and when the skin is loosened around the first bone, this is cut through the middle, or, if sufficiently exposed, at the elbow joint. When the skull is exposed, much care is required to remove the delicate membrane of the ear without tearing it; and similar care is required not to cut through the membrane that covers the eye. The eyes themselves are removed from their sockets and the brain from the skull, several cuts being made through the latter near the base of the lower jaw and through the roof of the mouth, &c. Every particle of muscle and fat being removed from the head and neck, the preservative is abundantly applied in and about the skull and also to the inside of the skin, and the parts are then restored to their natural position. The muscle and fat are also removed from about the wings, legs, and tail, and if necessary an incision is made along the forearm so as to expose the two joints for this purpose. The remaining bones of the two wings should then be tied together inside of the skin by strings drawn up till the wings are brought to the same distance apart as when attached to the body. Skins may be transported in this condition, or be immediately stuffed. This operation is performed by introducing cotton through the mouth into the orbits and upper part of the throat until these acquire their natural shape. A roll of cotton is then put into the skin and pushed firmly up the neck to the base of the skull. The body is then filled, not quite to its original dimensions, and the incision in the skin is sewed up. The bird may be kept in a cylinder of paper into which it is thrust, the legs and mandibles being first tied together and the feathers carefully adjusted. If the specimens are to be set up in natural positions, wires are introduced in the course of the stuffing and secured in the wings, neck, and feet, coming out through the latter. Glass eyes are manufactured and sold to be introduced in the orbits in imitation of the natural ones. In skinning birds with large heads and long necks, it is sometimes necessary after reaching the base of the skull to cut off the neck, and then drawing back the head make an incision on the outside down the back of the skull in order to skin the head. The process of skinning is variously modified according to the different characters of the animals. To protect hair or fur against moths and other destructive insects, the skins should be soaked in a solution of corrosive sublimate in alcohol or whiskey for a day to several weeks according to the size; they must then be thoroughly washed or rinsed in clean water. Finely powdered green vitriol sprinkled in feathers is an excellent protection against moths.—The larger fishes are also skinned and stuffed; but in many cases it is sufficient to preserve only one half the fish, and the method then pursued is as follows. The fish is laid on a table with the left side up, the fins are spread out, and a piece of paper is laid under each one that is to be preserved. When the fins are dried, the fish is turned over and a cut is made through the skin from the upper and posterior part of the head along the back to the tail, across the base of the caudal fin down, and thence along the belly to the lower part of the head again, cutting below the articulations of the dorsal, caudal, and anal fins. The body is then separated from the left side of the skin, commencing at the tail, and is cut off near the head. The inside of the head is then cleaned out and the eye is removed, leaving only the cornea and pupil, which are covered with a piece of black paper of the size of the orbit. The preservative is then applied, and the head and section of the body are filled with cotton, when the skin is turned over, pinned down upon a board at the base of the fins, and left to dry.—Detailed directions for preserving objects of natural history are given by Prof. S. F. Baird, in the "Report of the Smithsonian Institution" for 1856. See also Swainson's "Taxidermy," forming a volume of Lardner's "Cabinet Cyclopædia."

TAY, a river and loch of Perthshire, Scotland. The river rises in a small loch on the border of Argyleshire, and is called the Fillan until it passes through Loch Dochart, 8 or 9 m., and thence to Loch Tay, 10 m. further, it is generally known as the Dochart. Near Loch Tay it receives the Lochie, and below that loch the river Lyon and numerous other tributaries. Its whole length is nearly 120 m., and its course describes almost a semicircle from N. E. to S., until it reaches Perth, whence it flows nearly E. through the frith of Tay into the North sea. It has tide water to Perth, and is navigable that distance for vessels drawing 9 feet. From this point it flows through the finest valley of Scotland, and discharges a larger volume of water than any other river of the British islands. Its salmon fisheries are celebrated. Loch Tay is a romantic lake about 14 m. long and 1 m. wide, with steep, precipitous banks, and is said to have been sounded to a depth of 600 feet. The mountain Ben Lawers, on its N. W. shore, rises to a height of 3,945 feet.

TAYGETUS. See Laconia.

TAYLOR, the name of counties in 6 of the United States. I. A N. W. co of Va., intersected by the Tygart's Valley river; area, 130 sq. m.; pop. in 1860, 7,463, of whom 112 were slaves. The surface is very hilly, and the soil in some parts fertile. The productions in 1850 were 101,118 bushels of Indian corn, 23,995 of wheat, 41,499 of oats, 4,051 tons of hay, and 87,110 lbs. of butter. There were 11 churches, and 702 pupils attending the public schools. Iron ore and bituminous coal are abundant. The value of real estate in 1856 was $1,226,984, being an increase of 10 per cent. since 1850. Capital, Williamsport. II. A W. co. of Ga., formed since the census of 1850, bounded E. by

Flint river and drained by White Water and other creeks; area, about 400 sq. m.; pop. in 1860, 6,000, of whom 2,897 were slaves. The surface is undulating and the soil generally fertile. It is intersected by the Muscogee railroad. Capital, Butler. III. A new co. of Fla., bounded S. W. by Appalachee bay and W. by the Aucilla river, and drained by the Fenaholoway; area, over 1,000 sq. m.; pop. in 1860, 1,384, of whom 125 were slaves. IV. A W. co. of Texas, drained by affluents of the Brazos and Colorado rivers; area, 625 sq. m. It was still unorganized when the census of 1860 was taken. Capital, Taylor. V. A central co. of Ky., drained by Green river and its affluents; area, about 275 sq. m.; pop. in 1860, 7,481, of whom 1,597 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 365,085 bushels of Indian corn, 91,639 of oats, 10,087 of wheat, and 592,106 lbs. of tobacco. There were 17 churches, and 461 pupils attending public schools. The proposed route of the Danville and Nashville railroad passes through this county. Capital, Campbellsville. VI. A S. W. co. of Iowa, bordering on Mo., and drained by East Nodaway, One Hundred and Two, and Platte rivers; area, 560 sq. m.; pop. in 1860, 3,589. The surface is generally level and the soil fertile. The productions in 1859 were 137,162 bushels of Indian corn, 5,604 of wheat, 4,163 lbs. of wool, 54,009 of butter, and 2,007 gallons of sorghum molasses. It is on the line of the projected southern railroad. Capital, Bedford.

TAYLOR, Bayard, an American author and traveller, born in Kennett Square, Chester co., Penn., Jan. 11, 1825. At 17 years of age he became an apprentice in a printing office in West Chester, and at the same time a contributor of verses to the periodical press. In 1844 he published a volume of poems under the title of "Ximena," and having collected a small sum of money, the fruits of his past and prospective literary labors, he departed on a European tour, principally pedestrian, of which he published an account on his return to America in 1846, entitled "Views a-Foot, or Europe seen with Knapsack and Staff." After editing for a year a newspaper in Phœnixville, Penn., he removed to New York, and wrote for the "Literary World," and subsequently for the "New York Tribune," of which journal he became in 1849 a part proprietor and associate editor. Soon afterward he commenced the first of a series of extensive foreign tours, which have since occupied the greater portion of his time, and the narratives of which have regularly appeared in the columns of the "Tribune" in the form of epistolary correspondence, and subsequently been gathered into volumes of travels. Visiting California in 1849, then the focus of attraction to adventurous spirits on account of the recent discovery of its gold fields, he returned home by way of Mexico, and published in 1850 "El Dorado, or Adventures in the Path of Empire." In the summer of 1851 he set out on a protracted tour in the East, in the course of which he ascended the Nile to lat. 12° 30′ N., and afterward traversed large portions of Asia Minor, Syria, and Europe; and in the latter part of 1852 he made a new departure from England, crossing Asia to Calcutta, and thence proceeding to China, where he was enabled to join the expedition of Commodore Perry to Japan. Returning to New York in Dec. 1853, he published in the succeeding year his "Journey to Central Africa" and "Lands of the Saracen," followed by "Visit to India, China, Loo-Choo, and Japan in 1853." His subsequent travels are indicated by the titles of the volumes recording them: "Northern Travel; Summer and Winter Pictures of Sweden, Denmark, and Lapland" (London and New York, 1857), and "Travels in Greece and Russia, with an Excursion to Crete." Mr. Taylor's first considerable volume of poems was entitled "Rhymes of Travel, Ballads, and other Poems" (1848), and was followed by a "Book of Romances, Lyrics, and Songs" (1851); "Poems of the Orient" (1854); and "Poems of Home and Travel" (1855), the last named volume, according to the author's statement in the preface, comprising such pieces only as he desired to acknowledge. In connection with his travels he has also produced "At Home and Abroad; a Sketch Book of Life, Scenery, and Men" (1859; 2d series, 1862); and he has edited a "Cyclopædia of Modern Travel" (8vo., Cincinnati, 1856). A volume of poems, entitled "The Poet's Journal," and a novel of American life, are announced to appear in the course of 1862. Mr. Taylor's poem of "The American Legend" was originally delivered before the Phi Beta Kappa society of Harvard university in 1850.

TAYLOR, Brook, an English mathematician, born at Edmonton, Aug. 28, 1685, died at his estate of Bifrons in Kent, Dec. 29, 1731. In 1701 he entered St. John's college, Cambridge, where he soon distinguished himself as a mathematician, in 1708 wrote his treatise on the "Centre of Oscillation," which was not published till some years later, in 1709 took the degree of LL.B., and in 1712 was chosen a fellow of the royal society. He had already solved Kepler's problem, and was corresponding with Dr. Keill on the most abstruse mathematical topics. From 1714 to 1718 he was secretary of the royal society, to which he contributed papers of great ability on magnetism and mathematical subjects. His *Methodus Incrementorum* (1715) is the first treatise in which the calculus of finite differences is proposed for consideration. In 1715 he conducted a controversial correspondence with Count Raymond de Montmort on the tenets of Malebranche, and in 1719 he published his "New Principles of Linear Perspective." Among his manuscripts are a "Treatise on Jewish Sacrifices," and a dissertation on the "Lawfulness of Eating Blood." He also prepared a "Treatise on Logarithms," which was not printed. In the last year of his life he sank into a condition of partial imbecility.

TAYLOR, George, one of the signers of the declaration of independence, born in Ireland in 1716, died in Easton, Penn., Feb. 23, 1781. He received a good education, but disliking the medical profession, for which he was destined, came to America as a "redemptioner," and on his arrival bound himself for a term of years to an iron manufacturer at Durham, Penn., and was at first employed in menial occupations. His education and intelligence being discovered, his employer made him his clerk, and after his death Taylor married his widow and became master of the establishment. He was elected to the provincial assembly in 1764, and was one of the committee to call a general congress and to instruct the delegates. He continued a member of the provincial assembly till 1770, when he was made a judge of the county court and colonel of militia. In Oct. 1775, he was again elected to the provincial assembly, and was active in the promotion of revolutionary measures. The action of some of the members of the continental congress in the summer of the next year, in refusing their assent to the declaration of independence, led to the election of new members on July 20, 1776, of whom Mr. Taylor was one. He signed the declaration on Aug. 2, subsequently negotiated a treaty with several of the Indian tribes on behalf of the United States, and in March, 1777, retired from congress, and did not again return to public life.

TAYLOR, Henry, an English author, born in the early part of the 19th century. In 1824 he entered the colonial office, where he is now the second senior clerk. His writings, produced principally between 1827 and 1850, comprise dramas, poems, and essays. He is chiefly known by two dramas in blank verse, "Philip van Artevelde" (1834) and "Edwin the Fair," which have been aptly described as illustrations of the form "we might expect the written drama naturally to assume, if it were to revive in the 19th century, and maintain itself as a branch of literature apart from the stage." His remaining works include "The Eve of the Conquest, and other Poems" (1847); "Notes from Life, in Six Essays" (1848); "Notes from Books, in Four Essays" (1849); and "The Virgin Widow" (1850), a play in 5 acts, chiefly in verse. In 1836 he published "The Statesman," embodying much of his experience of public life.

TAYLOR, Isaac, an English author, born at Lavenham, Suffolk, Aug. 17, 1787. His father, Isaac Taylor, originally a line engraver in London, became minister of dissenting congregations in Colchester and Ongar, and wrote several popular books for children. His mother, Ann Taylor, also wrote "Maternal Solicitude" and other educational works. He was privately and carefully educated, with reference in turn to the dissenting pulpit, the bar, and to art as a profession, but was led by his tastes to the pursuits of literature and scholarship. He has lived in studious retirement at Stanford Rivers, Essex, devoting himself to the education of his children at home and to the composition of important works on philosophical and religious questions. Although a layman, he occasionally preaches on Sunday. His first publications were: "Elements of Thought" (1822), in which he showed himself a disciple of the Scotch metaphysical school; "History of the Transmission of Ancient Books to Modern Times" (1827), an account particularly of the means by which the authenticity of the Holy Scriptures is ascertained; and "The Process of Historical Proof" (1828), also written in defence of the genuineness of the documentary evidence of Christianity. In 1829 appeared anonymously the "Natural History of Enthusiasm," his most popular work, which pictures in glowing language and with unsectarian zeal an era of revived faith and ecclesiastical union, and which, notwithstanding its elaborately grandiloquent style, was received with special favor by the religious public at the time when the excitement connected with Edward Irving was at its height. It was the first of a series of essays which he meditated on fanaticism, superstition, credulity, the corruption of morals, and scepticism, in which all the principal phases of abnormal religious development should be treated. Of these only the essay on "Fanaticism" (1843) was written, the author having been diverted from his plan by the appearance of the Oxford "Tracts for the Times." He published a series of tracts in reply to those of Dr. Pusey and his associates, which were collected under the title of "Ancient Christianity" (2 vols., 1839-'43). He wrote with similar intent a work on "Spiritual Despotism" (1835), characterized by Sir James Stephen as "the most original, comprehensive, and profound contribution which any living writer in England has made to the science of ecclesiastical polity." His "Physical Theory of Another Life" (1836), in form a speculative treatise, is substantially a narrative of the scenes and incidents of immortality, illustrated from both sacred and profane writers. His most important later publications are: "Loyola and Jesuitism" (1849), and "Wesley and Methodism" (1851), in which he reviews two of the principal modern movements in the Roman Catholic and Protestant churches; "The Restoration of Belief" (1853), an examination of recent sceptical tendencies and results; "The World of Mind" (1857), the aim of which was to set forth "first, what is common to all orders of living beings, and then what is peculiar to the human mind, and which is the ground of its immeasurable superiority;" and "The Spirit of the Hebrew Poetry" (1861), in which he argues that David and Isaiah are the indispensable guides of theistic thought, and that all departure from the theological phraseology of the Hebrew poets is almost always a step toward atheism. He is also the author of several less speculative didactic and devotional volumes, entitled "Home Education" (1838), "Lectures on Spiritual Christianity" (1841), and "Saturday Evening" (1842), and has contributed many essays to reviews.—His sisters, Ann Taylor (Mrs. Gilbert) and Jane Taylor (1783-1824), wrote jointly several juvenile books which had remarkable success, as "Hymns for Infant Minds" and "Original Poems." The latter also wrote "Essays in Rhyme," a tale entitled "Display," and "Contributions of Q. Q."

TAYLOR, Isidore Séverin Justin, baron, a French traveller and author, born in Brussels, Aug. 15, 1789. He studied design under the painter Suvé, and had commenced the life of a *littérateur* and artist when he was enrolled in the French conscription of 1811, but obtained his discharge and made a tour of artistic exploration in Flanders, Germany, and Italy. Returning to France in the last days of the empire, he served several years in the army, rising to the position of major and aide-de-camp of Gen. Dorsey. He then resigned and made excursions to Italy, Greece, European Turkey, Asia Minor, Syria, Egypt, and the African coasts, bringing thence rich collections in archæology or objects of curiosity, which he placed in the galleries of Versailles, the Louvre, and the various museums of Paris. He exerted himself also to procure from the French chambers the restoration of the principal monuments of the middle ages in France; in 1824 was made royal commissary of the *comédie Française*, and introduced great improvements in scenery and in the character of the operas performed; and at the direction of the government twice visited Egypt, and negotiated the transfer to France of the obelisks of Luxor and the other rare Egyptian antiquities of the Louvre museum. Louis Philippe after his accession confided to him several important artistic missions. Baron Taylor has been very active also in the organization of societies for the benefit of artists and men of letters, of several of which he is perpetual president. In connection with C. Nodier and De Caillieu, he edited *Voyages pittoresques et romantiques dans l'ancienne France* (fol., 1820-'54), a work still incomplete, in the illustration of which several of the most eminent artists in France have assisted; *Voyage pittoresque en Espagne, en Portugal et sur la côte d'Afrique de Tanger à Tétouan* (4to., 1826 *et seq.*); *La Syrie, l'Égypte, la Palestine et la Judée* (4to., 1837 *et seq.*); *Pèlerinage à Jérusalem* (1841); and *Voyage en Suisse, en Italie, en Sicile, en Angleterre, en Écosse, en Allemagne, en Grèce*, &c. (1843). While in the army he also published 5 dramas (1815-'22).

TAYLOR, Jeremy, D.D., an English theologian, born in Cambridge in 1613, died at Lisburn, Ireland, Aug. 13, 1667. His father was a barber and surgeon. The son was educated at the grammar school in Cambridge, and at the age of 13 entered Caius college as a sizar, or poor scholar. In 1633 he received the degree of M.A., having distinguished himself by his proficiency in theological studies. Having attracted the attention of Archbishop Laud, he received through his aid a fellowship in All Souls' college in Oxford, and the rectory of Uppingham in Rutland. His marriage in May, 1639, compelled him to relinquish his fellowship, and he remained in the quiet discharge of his pastoral duties until the troubles in the state drew him prominently into notice. In these political difficulties he took sides with the royalists, became a favorite with Charles I., and secured the degree of D.D. by a defence of episcopacy which he wrote at the king's request. For a time, as chaplain to the king, Taylor followed the fortunes of his master, losing by his devotion his living in the church, suffering imprisonment, and compelled at last to seek refuge in the parish of Llanfihangel, Caermarthenshire. Here, with William Nicholson, afterward bishop of Gloucester, and William Wyatt, afterward prebendary of Lincoln, Taylor for some time taught school. During his residence in Wales a large part of his sermons were composed, and several of his most elaborate works, among others his "Discourse on the Liberty of Prophesying," on "Holy Living and Dying," and the "Life of Christ." In these compositions his mild and tolerant spirit appears, as well as his aversion to controversy. In 1654, however, he ventured into the field of debate, as the opponent of transubstantiation and as the advocate of episcopacy. A double imprisonment was the result of this polemic zeal, and the loss of much of his second wife's fortune. Added to these troubles was the annoying suspicion of heresy concerning original sin, which was excited by his work on "Repentance." In 1658 he was confined in the tower of London, through the act of his publisher in prefixing to the "Collection of Offices" an engraving of a kneeling Christ. After his release he obtained the place of lecturer at Lisburn in Ireland, where he was removed in some degree from the enmity of the Puritan party. Yet even here he was closely watched, and was more than once in danger of arrest as an enemy to the state. After the death of Cromwell, Taylor returned to London, where he was received with honor as the defender of monarchy and the church, and was soon appointed by Charles II., to whom he had dedicated his "Ductor Dubitantium," to the bishopric of Down and Connor in Ireland, to which that of Dromore was soon added, and a member of the Irish privy council; and he was also elected vice-chancellor of the Dublin university. In the administration of his episcopal duties Taylor found great difficulty, from the confusion which the civil wars had wrought in the social condition and the religious life of the Irish people; and though he labored with unwearied fidelity, as pastor, as bishop, and as privy councillor, his episcopal life cannot be called successful.—As a writer of sermons, Jeremy Taylor has by general consent the highest rank among the writers of the English church. The characteristics of his style are: exuberant beauty of diction, both in the choice of words and the flow of the sentences; redundant illustration from natural scenery, from the customs of life, from science, from history, and from Scripture; great fondness for metaphor; accuracy of method in statement and in division; prolixity, running into almost endless digressions and reveries; with a prevailing moderation, dignity, and majesty of tone. His doctrines were those of moderate orthodoxy. He is the advocate of toleration, of freedom of thought, of charity, and of practical religion as of more worth than dogmatic strictness. His private life was free from any blemish, and even his foes honored his virtue. The works of Taylor have been published in many forms, sometimes separately, and sometimes in complete editions, as in that of Bishop Heber (15 vols., 1822). The most important are the "Holy Living and Dying," a very minute and practical treatise concerning all the routine of the Christian life; the "Life and Death of Jesus Christ," a treatise curious for its quaint and endless erudition, which is still very popular; the "Ductor Dubitantium," which deals with difficult points and cases of conscience; the "Liberty of Prophesying," which is the broadest and most catholic of all his treatises; and the "Dissuasive from Popery," an effort to convert the Irish people to the church of England. The life of Taylor has been written best by Bishop Heber, as the preface to his edition of Taylor's works, and by Willmot (London, 1846).

TAYLOR, John, an English author, called "the water poet," born in Gloucester in 1580, died in London in 1654. He was educated at the free school of Gloucester, and subsequently was apprenticed to a London waterman, an occupation which he followed during the greater part of his life. He also held some position at the tower of London, and kept a public house in Phœnix lane, Long Acre. His publications, in prose and in verse, amounting to upward of 80, have little literary merit, but are of value as illustrations of opinions and manners during the first half of the 17th century. Two of the most curious of his prose works are devoted to descriptions of a journey on foot to Scotland in 1618, and of another, made principally in a boat, from London to Hereford in 1641. He was a stanch loyalist, and when Charles I. was beheaded hung up over his hostel the sign of the "Mourning Crown." His title of "water poet" was self-conferred.

TAYLOR, John, D.D., an English dissenting minister, born near Lancaster in 1674, died at Warrington, March 5, 1761. He was educated at Whitehaven, and settled for 18 years at Kirkstead in Lincolnshire, where he taught a grammar school beside supplying the small congregation there. In 1733 he was chosen pastor of a Presbyterian congregation at Norwich, where he preached for 24 years, and avowed anti-Trinitarian sentiments. In 1757 he became principal of the dissenting academy at Warrington, but met with much opposition. His principal published works are: "An Hebrew English Concordance" (2 vols. fol.); "A Paraphrase on the Epistle to the Romans;" "The Scripture Doctrine of Original Sin;" "The Scripture Doctrine of the Atonement;" "A Sketch of Moral Philosophy;" and "A Scheme of Scripture Divinity," published after his death by his son.

TAYLOR, John, an English author and classical scholar, born in Shrewsbury in 1703, died in Cambridge, April 4, 1766. He was educated at Shrewsbury grammar school and at St. John's college, Cambridge, of which he became a fellow in 1730. Subsequently he became university librarian and registrar at Cambridge, where the greater part of his life was passed. His first publication of importance was an edition of the orations and fragments of Lysias (4to., London, 1739), evincing a remarkably intimate knowledge of the Attic law. In 1741 he was admitted an advocate in doctors' commons, although it does not appear that he ever practised as a civilian; and in 1743 he produced a dissertation in Latin on the Sandwich marble and an edition of two orations by Demosthenes and Lycurgus. Several years later he took orders, and in 1757 was appointed canon residentiary of St. Paul's. In 1755 appeared his most important work, "Elements of Civil Law," of which a 2d edition was published in 1769, and an abridgment in 1793 under the title of "A Summary of the Roman Law." During the latter part of his life he was engaged upon an edition of the Greek orators, to comprise 5 volumes, of which the 3d, containing the 10 orations of Demosthenes, appeared in 1748, and the 2d, containing the controversial orations of Demosthenes and Æschines, together with the epistles ascribed to the latter, in 1757. The remainder of the work was left incomplete at his death.

TAYLOR, Nathaniel William, D.D., an American clergyman, born in New Milford, Conn., June 23, 1786, died in New Haven, March 10, 1858. He was graduated at Yale college in 1807, and then devoted 5 years to the study of theology, mainly under the guidance of President Dwight, in whose family he resided for two years as the president's amanuensis. In 1812 he was ordained pastor of the first church (Congregational) in New Haven, as the successor of Moses Stuart. As a preacher Dr. Taylor soon gained a wide reputation, both for the clearness and force of his reasoning in doctrinal discussions, and for the fervor and pathos of his practical appeals. When his mind was wrought up to its highest tone, his sermons were characterized as "logic on fire." In 1822 he was called to the Dwight professorship of didactic theology, then just established in Yale college. In this office he continued until his death, a period of 36 years, giving instruction to nearly 700 students in course of preparation for the ministry. While yet a pastor, Dr. Taylor had shown his aptitude for theological discussion, in a series of articles upon the Unitarian controversy, which he contributed to the

"Monthly Christian Spectator." He had also in his sermons laid out the groundwork of that theodicy which, in his course of lectures on "The Moral Government of God," became afterward the great thought and labor of his life. The struggles of his own mind with philosophical doubts upon the truths of revealed religion, led him to give special attention to the study of natural theology, and of mental and moral science, as preparatory to the investigation of the Bible as a revelation. In such studies he exhibited an ardor in the pursuit of truth, an honesty of conviction, an independence in thinking, and a courage and candor in argument, which commanded respect and admiration, even where his conclusions provoked dissent. These qualities gave him a rare magnetic power over the minds of young men. In theology, Dr. Taylor was in the main a disciple of Edwards and Dwight, adopting the Calvinistic theory as modified by the Edwardean school. In 1828 he preached at New Haven the *concio ad clerum*, in which he set forth views upon human depravity and other related doctrines which provoked much controversy in New England, and caused him to be widely denounced for heresy. For several years he maintained a vigorous discussion of these and similar topics, through the quarterly "Christian Spectator," sometimes writing with a marked individuality of style, sometimes anonymously reviewing both himself and his opponents. Dr. Taylor insisted much upon the freedom of the will and the responsibility of the individual man; he held that, while depravity is universal in the race, it is not to be ascribed to any property, propensity, or disposition of the soul prior to actual transgression, as sinful in itself, or as the necessary cause of sin, nor to a sinful nature corrupted in or derived from Adam. He traced sin to the constitutional propensity of man for natural good, as perverted by his own moral agency; thus he maintained moral obligation unimpaired. At the same time, by harmonizing certainty with freedom, in the sphere of moral action, he also maintained the supremacy of the divine government in the spiritual as in the natural world. Though his views may have hereafter less prominence as a system than when they were urged and defended by his own resolute will, his earnest logic, and his fervid eloquence, yet they have separately incorporated themselves so widely with the preaching of recent times, that they have silently modified, and, as it is claimed, in the true sense rationalized the Calvinistic theology, without appearing to revolutionize it. Dr. Taylor was always averse to publication; and with the exception of a few occasional sermons, and the controversial articles above referred to, he committed nothing to the press during his long life. Since his death 4 8vo. volumes of his works have been published: one a volume of practical sermons, another a volume of essays and discourses upon the more perplexing and controverted topics of revealed theology, and the remaining two his argument upon the moral government of God. The system of mental philosophy which he so carefully elaborated, and which was his special delight, has not yet been published.

TAYLOR, Richard, an English printer and naturalist, born in Norwich, May 18, 1781, died in Richmond, Dec. 1, 1858. While serving an apprenticeship to a printer in London, he studied the classics and the mediæval Latin and Italian authors, and also the Flemish, Anglo-Saxon, and several of the kindred Teutonic dialects. In 1803 he established himself in business with his father as a printer, and his press soon became the medium through which nearly all the more important works in scientific natural history were published. The beautiful editions of the classics which also issued from it were long celebrated in England. In 1807 he became a fellow of the Linnæan society, and in 1810 was elected its under secretary, an office which he held nearly half a century. He also attached himself from the commencement to the "British Association for the Advancement of Science." In 1822 he became a joint editor of the "Philosophical Magazine," with which he was connected until his death, and in 1838 he established the "Annals of Natural History." His own literary labors, which were principally in the field of biblical and philological research, comprise an edition of Tooke's "Diversions of Purley" (London, 1829 and 1840), enriched with notes; Warton's "History of English Poetry" (London, 1840), in the reëditing of which he took the chief part; "Taylor's Scientific Memoirs," a series of papers chiefly translated, &c. He warmly promoted the establishment of University college and the university of London.

TAYLOR, Richard Cowling, an English geologist, born in Hinton, Suffolk, Jan. 18, 1789, died in Philadelphia, Penn., Oct. 26, 1851. He was educated as a mining engineer and geologist, partly under the auspices of William Smith, the "father of British geology," and in the early part of his career was employed on the ordnance survey of England. Subsequently he was engaged for many years in investigating and reporting upon mining properties in various parts of England, including that of the British iron company in Wales, his plaster model of which received the gold Isis medal of the society of arts. In 1830 he removed to the United States, and, after surveying the Blossburg coal region in Pennsylvania, devoted 3 years to the exploration of the coal and iron veins of Dauphin co. in the same state, on which he published an elaborate report with maps. For a number of years he was occupied with similar undertakings in the United States, and also made surveys of mining lands in Cuba and the British provinces. In the course of his labors he made careful notes of the chief facts connected with general geology and palæontology, the results of which were published in the "Transactions" of the principal scientific bodies of England and America. The work, however, on which his reputation rests is his "Statistics of Coal" (8vo., Philadelphia, 1848), which had engaged him for many years, and which was regarded as the standard authority on the distribution, production, and consumption of fossil fuel. Beside his proficiency in economic geology, in which he stood preëminent, he was well informed in theoretic geology, and was the first to refer the old red sandstone underlying the Pennsylvania coal fields to its true position, corresponding with its place in the series of European rocks. During his residence in England he gave much attention to archæology, and published in 1821 an "Index Monasticus, in the Ancient Kingdom of Anglia" (fol.), followed by a very complete "General Index to Dugdale's Monasticon Anglicanum" (fol., 1830).

TAYLOR, Stephen William, LL.D., an American educator, born in Adams, Berkshire co., Mass., Oct. 23, 1791, died at Hamilton, Madison co., N. Y., Jan. 7, 1856. He was graduated at Hamilton college, N. Y., in 1817, and took charge of the Black river academy at Lowville, Lewis co., where he remained for 14 years. In 1831 he resigned and became the teacher of a family school, and in 1834 was invited to take charge of the preparatory department of the "Hamilton Institution," now Madison university. In 1838 he was elected to the chair of mathematics and natural philosophy, which he resigned in 1845, and in the following winter removed into Pennsylvania and aided in the establishment of the university at Lewisburg, of which he was chosen the first president. At the end of 5 years (1851), the institution being placed in a flourishing condition, he resigned, and in the same year was offered the presidency of Madison university, then in a state of great depression from the efforts to transfer the collegiate department to Rochester, and the removal of a majority of its faculty and board to that city, although the supreme court had decided that Madison university must remain at Hamilton. He entered upon his duties in the autumn of 1851, and within 3 years the university was stronger in resources and the number of its students than at any previous time. A historical sketch of Madison university, several inaugural and baccalaureate discourses, and a series of essays on the theory of education published in the "Christian Chronicle," Philadelphia, are all that remain of his published works. He had partially completed at the time of his death an elaborate work on education.

TAYLOR, Thomas, an English scholar and translator, surnamed the "Platonist," born in London, May 15, 1758, died at Walworth, Nov. 1, 1835. He studied the classics, mathematics, and chemistry, but was obliged to relinquish his design of entering a university, and became a clerk in a banking house. Having been appointed assistant secretary of the society for the encouragement of arts, manufactures, and commerce, he resolved to attempt an English version of all the works of Aristotle and Plato and those of the Neo-Platonists. The duke of Norfolk and others defrayed the expense of the publication of many of these, but Mr. Taylor received little or no profit from them. In this way he issued, in the course of 40 years, translations of part or the whole of Ocellus, the hymns of Orpheus, the complete works of Plato in 5 vols. 4to., Proclus, the emperor Julian, Pausanias, Plotinus, Apuleius, Aristotle, Maximus Tyrius, Demophilus, Iamblichus, Hierocles, Porphyry, Celsus, Olympiodorus, and the "Chaldean Oracles." Beside these he published works on geometry and arithmetic, on the Eleusinian and Bacchic mysteries, on "The Rights of Brutes" (in ridicule of Paine's "Rights of Man"), "Miscellanies in Prose and Verse," &c. His works amounted to 55 vols. 8vo. or 4to.

TAYLOR, Tom, an English author, born in Sunderland, Durham, in 1817. He was educated at the Grange school of his native town, passed some time at the university of Glasgow, and was graduated at Trinity college, Cambridge, of which he became a fellow. After filling for a few years the chair of English literature in University college, London, he was in 1845 called to the bar, and went the northern circuit, until his appointment in 1850 as assistant secretary to the board of health, of which in 1854 he became secretary. Since 1858 he has held the position of secretary to the local government act office. He was a frequent contributor to the early volumes of "Punch," and is favorably known as the author of numerous dramatic pieces, among the most successful of which have been "Still Waters Run Deep," "The Unequal Match," and "The Overland Route." Of more pretension and value than these are his biography of Benjamin Robert Haydon, prepared from the journals of the artist, and his editorial preface and continuation to the "Autobiography of Charles Robert Leslie." His contributions to the periodical press have been numerous.

TAYLOR, William, an English author and translator, born in Norwich in 1765, died there in March, 1836. He completed his education in France, Italy, and Germany, returned to Norwich in 1783, and soon began to write for periodicals and translate from German writers. In 1802 he became editor of the "Norwich Iris," a weekly journal, which he continued for two years. Among his publications are translations of Bürger's "Lenore" and Lessing's "Nathan the Wise," a collection of essays on English synonymes, and critical essays on the German poets, with translations, entitled "Survey of German Poetry" (1830). His "Life and Writings," including his correspondence with Southey, was published in 1843, with a memoir by J. W. Robberds (2 vols. 8vo.).

TAYLOR, William Cooke, LL.D., an Irish author, born in Youghal, April 16, 1800, died in Dublin, Sept. 12, 1849. He was educated at the university of Dublin, and commenced contributing to the periodical press at an early age. He went to London about 1828, and till his death was constantly engaged in literary labor. His chief works are: "Historical Miscellany" (1829); "History of France and Normandy" (1830); manuals of ancient and modern history; "Natural History of Society" (2 vols.); "History of Mohammedanism;" "History of Christianity;" "History of the Civil Wars in Ireland;" "History of British India;" "Life and Times of Sir Robert Peel" (3 vols.); "Revolutions and Remarkable Conspiracies in Europe" (3 vols.); "Romantic Biography;" "The Bible Illustrated from Egyptian Monuments;" "History of Popery;" and the "History of the House of Orleans," which was his last work. In 1846 he was employed by the British government to inquire into the system of education on the continent, and at the time of his death was about to be appointed superintendent of national education in Ireland.

TAYLOR, Zachary, the 12th president of the United States, born in Orange co., Va., Nov. 24, 1784, died in Washington, D. C., July 9, 1850. His father, Col. Richard Taylor, was a Virginian of a distinguished family, who served with zeal and courage throughout the revolutionary war, and subsequently removed to Kentucky, where he was one of the first settlers of Louisville, in the neighborhood of which city he had an extensive plantation. Zachary was but a few months old at the time of his father's emigration from Virginia; and as Kentucky during his infancy and early boyhood was thinly peopled and greatly harassed by the Indians, his means of education were very limited, and were confined to the simplest rudiments of learning. Until his 24th year he was engaged in the labors of the plantation; but his brother Hancock, a lieutenant in the U. S. army, having died in 1808, through the influence of Madison, then secretary of state, who was a relative of the Taylor family, the vacant commission was assigned to Zachary, and he became first lieutenant in the 7th regiment of infantry. He was made a captain in Nov. 1810, and two years later, after the declaration of war against Great Britain, was placed in command of Fort Harrison, a blockhouse and stockade on the Wabash river, about 50 miles above Vincennes. This place was one of the most advanced posts of the United States on the Indian frontier, and was the first object of attack by the tribes whom Tecumseh had stirred up to war against the Americans. Early in September it was invested by a large force of Indians, who, after a futile attempt to outwit the young captain by professions of peace, made a furious night assault, and succeeded in setting fire to the lower buildings of the fort. Taylor had but 50 men, of whom two thirds were ill with fever. He maintained the defence, however, with skill and steadiness, and after a sharp conflict of several hours extinguished the flames and repulsed the savage assailants with such severe loss that at daybreak they abandoned the siege. For his conduct on this occasion he received from the president the rank of major by brevet, the first instance in the service of this species of promotion. A few months later he took part in a successful expedition led by Gen. Hopkins against the Indian villages, and from that time to the close of the war was actively engaged in service on the N. W. frontier. In 1814 he attained the full rank of major, and commanded an expedition against the British and Indians on Rock river, during which he fought an indecisive action with a superior force of the enemy strongly posted at the mouth of the river. On the restoration of peace in 1815, congress reduced the army and annulled many of the promotions made during the war. By this means Taylor was reduced to the rank of captain, and in consequence resigned his commission and retired to his plantation near Louisville. The influence of his friends, however, soon procured his reinstatement as major, and he was employed for several years alternately on the N. W. frontier and in the south, where in 1822 he built Fort Jesup. In 1826 he was a member of a board of officers convened by the secretary of war to consider and prepare a system for the organization and improvement of the militia of the United States. A report drawn by Gen. Scott was adopted on Taylor's motion, and was approved in congress, but never carried into effect. In 1819 Taylor had received a commission as lieutenant-colonel, and in 1832 he was promoted to the rank of colonel. In the latter year he was engaged in the Black Hawk war, and Black Hawk after his capture was placed in his charge to be conveyed a prisoner to Jefferson barracks. After the war Taylor was ordered to Prairie du Chien, where he took command of Fort Crawford, a work which had been erected under his superintendence. In 1836 he was ordered to Florida, where the war with the Seminoles was then going on without much prospect of a speedy termination. On Dec. 25, 1837, he defeated the Indians in the battle of Okechobee, one of the most desperate and hotly contested in the annals of our warfare with the red men, and which had a decisive effect upon the duration of the struggle, the Seminoles never again rallying in sufficient force to be formidable to the whites. Taylor was rewarded for this affair by promotion to the rank of brigadier-general by brevet, and in April, 1838, he was made commander-in-chief in Florida in place of Gen. Jesup. This post he held till 1840, when he was relieved from it at his own request, and was immediately appointed to the command of the first department of the army in the south-west, comprehending the states of Alabama, Mississippi, Arkansas, and Louisiana. He purchased at this time an estate at Baton Rouge on the banks of the Mississippi, to which he removed his family from Kentucky. On March 1, 1845, congress passed the joint resolution annexing Texas, and on May 28 Mr. Marcy, the secretary of war, sent a confidential letter to Gen. Taylor, instructing him to hold the troops under his command in readiness to defend Texas in case of an invasion from Mexico. He demanded more explicit instructions, and in reply was directed generally to be governed by circumstances, to avoid all aggressive measures, and to hold his army ready to protect the Texan territory "to the extent that it had been occupied by the people of Texas." The Rio Grande was indicated by the secretary as the boundary of Texas, though the Mexicans maintained that Texas never extended west of the Nueces. Corpus Christi, on Aransas bay, near the mouth of the Nueces, was pointed out as the best point for concentrating the U. S. forces; and accordingly in July, 1845, Taylor embarked at New Orleans with 1,500 troops, and in the beginning of August encamped with them at Corpus Christi, where he was followed by reënforcements, so that in November his forces amounted to about 4,000 men. He remained for several months, during which his conduct under the most embarrassing circumstances was marked by great prudence and discretion. The administration desired to bring the Mexican question to a crisis, without, if possible, incurring the responsibility of beginning a war. Indirectly, therefore, it endeavored to induce Gen. Taylor to advance his forces into the disputed territory; but the wary old soldier disregarded all hints to that effect, and would not move till explicitly ordered to do so by the president. Positive instructions were at length sent, and on March 8, 1846, the army began its march toward the Rio Grande, and on the 28th reached the banks of that river opposite Matamoras. Here it encamped and erected Fort Brown, which commanded Matamoras, where the Mexicans were also throwing up batteries and redoubts. On April 12 Gen. Ampudia, the Mexican commander, addressed a note to Gen. Taylor requiring him within 24 hours to break up his camp and retire beyond the Nueces, "while our governments are regulating the pending question in relation to Texas," and informing him that his non-compliance would be regarded by the Mexicans as equivalent to a declaration of war. Gen. Taylor replied that he was acting under instructions which did not permit him to return to the Nueces, and that if the Mexicans saw fit to commence hostilities he should not avoid the conflict. Ampudia was soon after superseded as Mexican commander-in-chief by Arista, who early in May crossed the Rio Grande with a force of 6,000 men, and on the 8th of that month attacked and was defeated by Gen. Taylor with 2,300 men at Palo Alto, a few miles from Matamoras. (See PALO ALTO.) The Mexicans retreated to Resaca de la Palma, where they took up a strong position, and on the following day again gave battle to the Americans, who after a severe contest routed them with great loss and drove them across the Rio Grande. The total loss of the Mexicans in these battles amounted to about 1,000 men. In his report to the government Gen. Taylor said: "Our victory has been decisive. A small force has overcome immense odds of the best troops that Mexico can furnish—veteran regiments, perfectly equipped and appointed. Eight pieces of artillery, several colors and standards, a great number of prisoners, including 14 officers, and a large amount of baggage and public property, have fallen into our hands." The first intelligence of the outbreak of hostilities on the Rio Grande called forth a special message from the president (May 11), in which he declared that the Mexican government had "at last invaded our territory, and shed the blood of our fellow citizens on our own soil." Two days later congress declared that "by the act of the republic of Mexico war exists between that government and the United States," and at the same time authorized the president to accept the services of 50,000 volunteers. Meanwhile Taylor, who had been promoted to the rank of major-general as a reward for his victories, took possession of Matamoras on May 18 without opposition, and remained there awaiting reënforcements and organizing his forces till September, when he marched against Monterey, which he reached Sept. 9 with a force of 6,625 men, mostly volunteers. The place was defended by Gen. Ampudia with about 10,000 regular troops. On the 19th Gen. Taylor ordered an assault, and after 3 days' desperate fighting Gen. Ampudia capitulated on the 24th. (See MONTEREY.) Taylor made Monterey his headquarters, but occupied with a strong detachment the city of Saltillo, the capital of the state of Coahuila. He was diligently making preparations for an advance with an adequate army upon San Luis Potosi, an important city 300 miles south of Saltillo, when he received in December a letter from Gen. Scott, the commander-in-chief, who was then at New York, informing him that, as he was about to lead an expedition against Vera Cruz, "I shall be obliged to take from you most of the gallant officers and men, regulars and volunteers, whom you have so long and so nobly commanded." His troops were accordingly taken from him, as some of his friends alleged, from motives of jealousy on the part of the democratic leaders who controlled the administration, it being well understood that he was a whig in politics; and he was left to stand on the defensive with only 5,000 men, of whom but 500 were regulars, the rest being volunteers who had never seen a battle. He received intelligence that Santa Anna, the ablest of the Mexican generals, had concentrated at San Luis Potosi the flower of the Mexican army to the number of 21,000 veteran troops, and was moving rapidly to attack him in the valley of the Rio Grande. After carefully examining the ground, Taylor on Feb. 21, 1847, took a position at Buena Vista, a mountain pass 9 miles from Saltillo, and awaited the approach of the Mexicans, who made their appearance on the following day, and notwithstanding their immense superiority of numbers were signally defeated. (See BUENA VISTA.) Santa Anna retreated with his disheartened followers to San Luis Potosi, and during the rest of the war the frontier of the Rio Grande and the valley of that river remained in quiet possession of the Americans. For a period of several days before and after the battle all communication between the United States and Gen. Taylor's army had been cut off by detachments of Mexican cavalry, and great anxiety prevailed throughout the country as to the result of the encounter between forces so unequal. Rumors came from the Rio Grande that Taylor had been overpowered by the Mexicans and all his troops killed or captured. In consequence of this painful suspense the true tidings of the achievement of a splendid and decisive victory over very superior numbers were received with enthusiastic satisfaction, and the reputation and popularity of Gen. Taylor, already very great, attained the highest pitch. The modest and dignified tone of the despatches in which he announced to the government his victories largely contributed to heighten the public esteem for his character, and on his return home in Nov. 1847, "Old Rough and Ready," as his soldiers familiarly called him, was greeted everywhere by the warmest demonstrations of popular applause. This popularity naturally led to propositions to nominate him as a candidate for the presidency at the approaching election of 1848; and indeed, immediately after the reception of the news of the battles of Palo Alto and Resaca de la Palma, he had been so nominated by popular assemblages at Trenton, N. J., and in the city of New York. These hasty nominations, however, were made by persons of little consideration, and attracted but a small share of the public regard. In March, 1847, overtures were made to Gen. Taylor by some of the leaders of the native American party, to which he replied, April 28, that while the country was involved in war and he was engaged in operations against the enemy he could not acknowledge any ambition beyond that of bestowing all his best exertions toward obtaining an adjustment of our difficulties with Mexico. After his return home, however, he wrote and authorized the publication of several brief letters in which he defined his political position, and from which it appeared that he was, as he himself expressed it, "a whig, but not an ultra whig." In a letter to Peter Sken Smith, Jan. 30, 1848, he said: "I have neither the power nor the desire to dictate to the American people the exact manner in which they should proceed to nominate for the presidency of the United States. If they desire such a result, they must adopt the means best suited, in their opinion, to the consummation of the purpose; and if they think fit to bring me before them for this office, through their legislatures, mass meetings, or conventions, I cannot object to their designating these bodies as whig, democrat, or native. But in being thus nominated, I must insist on the condition—and my position on this point is immutable—that I shall not be brought forward by them as the candidate of their party, or considered as the exponent of their party doctrines." In a letter to Capt. J. S. Allison, April 22, 1848, he said: "I have consented to the use of my name as a candidate for the presidency. I have frankly avowed my own distrust of my fitness for this high station; but having, at the solicitation of many of my countrymen, taken my position as a candidate, I do not feel at liberty to surrender that position until my friends manifest a wish that I should retire from it. I will then most gladly do so. I have no private purposes to accomplish, no party projects to build up, no enemies to punish—nothing to serve but my country. . . . . I am a whig. If elected, I would not be the mere president of a party. I would endeavor to act independently of party domination. I should feel bound to administer the government untrammelled by party schemes. . . . . I shall engage in no schemes, no combinations, no intrigues. If the American people have not confidence in me, they ought not to give me their suffrages. If they do not, you know me well enough to believe me when I declare I shall be content. I am too old a soldier to murmur against such high authority." These declarations were satisfactory to a great portion of the people, especially of the whig party; and when the whig national convention met at Philadelphia, June 1, 1848, a considerable number of the delegates were pledged to the support of Gen. Taylor. Strong opposition, however, existed to him on various grounds. The friends of Daniel Webster and of Henry Clay insisted upon the claims of those eminent statesmen upon the whig party, and portrayed the injustice of setting them aside in deference to the mushroom popularity of a mere military chieftain, "an ignorant frontier colonel," as Mr. Webster called him, who had neither experience nor knowledge of civil affairs, and as he himself admitted had paid so little attention to politics as not to have voted for 40 years. It was also alleged that Gen. Taylor could hardly be considered a whig, and was of doubtful orthodoxy on many essential points of the whig political creed. The free-soil whigs further objected that Gen. Taylor was a slaveholder, and was not pledged against the extension of slavery, a question then predominant in American politics. Amid these conflicting views the convention began to ballot for a candidate. The whole number of votes was 280, and 141 were necessary to a choice. On the first ballot Taylor received 111 votes, Clay 97, Scott 43, Webster 22, all others 6; second ballot, Taylor 118, Clay 86, Scott 49, Webster 22; third ballot, Taylor 133, Clay 74, Scott 54, Webster 17; fourth ballot, Taylor 171, Clay 35, Scott 60, Webster 14, and Taylor was declared the candidate. Henry Wilson of Massachusetts and a few other delegates, on this result being announced, withdrew from the convention, and subsequently formed the freesoil party on the basis of opposition to the extension of slavery. They justified their secession from the convention and from the whig party, not only by the fact that Gen. Taylor was a slaveholder and not opposed to the extension of slavery, but also by maintaining that he was not really a whig, and especially that he was so unqualified by natural talent or acquired experience for the office of president, that his nomination was one "not fit to be made," as was subsequently said in a public speech by Mr. Webster, who for a time refused to acquiesce in the action of the convention. After the nomination of Gen. Taylor the whig convention proceeded to ballot for a candidate for the vice-presidency, and on the second ballot Millard Fillmore of New York was nominated. The democratic national convention had already nominated at Baltimore, May 22, 1848, Lewis Cass for the presidency; but a powerful section of the New York democracy, familiarly known as barnburners, refused their support to Mr. Cass, partly because of his pro-slavery position, and partly to punish him and his southern partisans for preventing the nomination of Martin Van Buren by the democratic national convention of 1844, when Mr. Van Buren was set aside for a comparatively obscure politician, Mr. Polk. On Aug. 9, 1848, these freesoil democrats assembled in a great mass and delegate convention at Buffalo, N. Y., together with the freesoil whigs who had rejected the nomination of Gen. Taylor, and the liberty party men who had previously supported James G. Birney as the distinctive anti-slavery candidate for the presidency. A fusion of these parties was effected on the basis of a platform of which opposition to the extension of slavery was the leading principle, and Martin Van Buren was nominated for president and Charles Francis Adams of Massachusetts for vice-president. The election took place in November, and for Taylor and Fillmore 163 electors were chosen to 127 for Cass and Butler, the democratic candidates. The Van Buren and Adams party did not succeed in carrying a single elector, their popular vote being 291,678, while that for Gen. Taylor was 1,362,081, and that for Cass 1,222,455. Gen. Taylor was inaugurated president on Monday, March 5, 1849, and on the following day appointed as his cabinet John M. Clayton of Delaware, secretary of state; William M. Meredith of Pennsylvania, secretary of the treasury; George W. Crawford of Georgia, secretary of war; William B. Preston of Virginia, secretary of the navy; Thomas Ewing of Ohio, secretary of the interior; Jacob Collamer of Vermont, postmaster-general; and Reverdy Johnson of Maryland, attorney-general. During the summer the president made a tour through the middle states as far as Lake Erie, and was everywhere received with manifestations of popular enthusiasm. Notwithstanding, however, his great personal popularity, the numerical preponderance of the democratic party in the country enabled it to elect a sufficient number of members of congress to give the opposition a decided majority not only in the senate but in the house of representatives. In the latter body a few freesoil members elected by the anti-slavery party held the balance of power between the whigs and democrats. On the opening of the 31st congress, Dec. 3, 1849, the house proved to be divided as follows: democrats, 112; whigs, 105; freesoilers, 13. Under these circumstances it was found impracticable to elect a speaker till Dec. 22, when the plurality rule was adopted, and on the 63d ballot Howell Cobb of Georgia, a democrat, was elected. Immediately afterward a vehement struggle commenced with regard to the organization of the new territories, the admission of California as a state, and the question of the boundary between Texas and New Mexico, all of these subjects being connected with the great and absorbing question of the extension of slavery. California had applied for admission into the Union with a constitution excluding slavery, which had been framed by a convention of the people without the usual preliminary authorization from congress. There being at this time an equal number of free and slave states in the Union, the proposition to admit California and thus give the free states a preponderance in the senate excited throughout the South the most violent opposition. At the same time New Mexico and Utah, or Deseret, as it was called by the Mormons who occupied it, were without governments, while the boundary question between New Mexico and Texas was creating great agitation in the southwest, the people of Texas threatening to take possession of the disputed territory by force. President Taylor in his messages to congress recommended, as the easiest way of settling the dispute, that California should be admitted, and that the other territories should form state constitutions to suit themselves, and should be admitted into the Union with or without slavery as their constitutions might prescribe. These recommendations were not acceptable to the slaveholding leaders, many of whom made open threats of secession in case of the admission of California. Scenes of violence occurred in the senate, and great excitement and agitation existed at Washington and throughout the country. Henry Clay in the senate, to settle the controversy, introduced propositions for "an amicable arrangement of all questions in controversy between the free and the slave states growing out of the subject of slavery." These propositions provided for the admission of California as a state; the formation of territorial governments in all the rest of the territory recently acquired from Mexico, without any restriction as to slavery; the determination of the boundary of Texas; the payment of the debt of Texas; declaring against the abolition of slavery in the district of Columbia; declaring that the slave trade in the district ought to be abolished, but that congress has no right to prohibit or obstruct the slave trade between the states; and lastly that a more stringent fugitive slave law should be passed. (See CLAY, HENRY, vol. v. p. 322.) Mr. Clay's propositions were still the subject in one form or another of exciting debates in congress and of earnest discussion among the people, when on the 4th of July, 1850, Gen. Taylor was seized with bilious fever, of which he died on the 9th at the presidential mansion.—In person Gen. Taylor was of middle stature and stout form, with dark complexion, high forehead, and keen penetrating eyes, with a face more remarkable for intelligence than for elegance, and an expression of much kindness and good nature. His manners and appearance were very plain and simple. As president he fully maintained the popularity which had led to his election, and was personally one of the most esteemed of those who have filled the chief executive office of the country. His administration will be ever memorable as the period in which the antagonism between the free states and the slave states reached a crisis that seriously threatened the Union—a crisis then avoided, however, by a compromise. It was during this administration that the secession party in the South first manifested itself in considerable force outside of the state of South Carolina. To the schemes of this party Gen. Taylor was sternly opposed, and in reply to a delegation of its congressional leaders, who waited upon him with threats of disunion and civil war, he said that if the standard of revolt were raised, he would himself take the field to suppress it at the head of an army of volunteers, and should not for that purpose deem it necessary to call upon a single soldier from the North.

TAZEWELL. I. A S. W. co. of Va., bordering on Ky., drained by the head streams of Clinch and Sandy rivers; area, 1,300 sq. m.; pop. in 1860, 9,920, of whom 1,202 were slaves. Clinch mountain and other ranges traverse the county. The soil of the valleys is very fertile. The productions in 1850 were 285,126 bushels of Indian corn, 125,214 of oats, 21,827 of wheat, and 135,910 lbs. of butter. There were 6 tanneries, 15 churches, a bank, and 654 pupils attending public schools. Capital, Jeffersonville. II. A central co. of Illinois, bounded N. W. by the Illinois river and intersected by the Mackinaw; area, 550 sq. m.; pop. in 1860, 21,471. The surface is level, consisting mostly of prairies, and the soil highly fertile. The productions in 1850 were 1,114,640 bushels of Indian corn, 144,241 of wheat, 146,992 of oats, 9,986 tons of hay, and 186,350 lbs. of butter. There were 8 grist mills, 11 saw mills, 17 churches, 2 newspaper offices, and 2,941 pupils attending public schools. Capital, Tremont.

TCHAD, or TSAD, a lake of Soodan, in central Africa, lying between lat. 12° 30′ and 14° 30′ N. and long. 13° and 15° E. It is about 150 m. long from N. to S. and 125 wide from E. to W., and has a probable area of 15,000 sq. m., varying greatly however in the dry and the rainy season. Its depth rarely exceeds 15 feet, and many portions of it during the dry season are rather a reedy swamp than a lake; the *inkibul* or open water in the dry season occupies only the central and S. W. part; its elevation above the sea level is 850 feet. The water is fresh and sweet, though that in the marshy pits along the shores is brackish in the dry season from the presence of natron. It has two considerable tributaries, the Komadugu and the Shary, the former flowing from the W., and the latter from the S., but no outlet. The shores abound with rushes and reeds, and the lagoons and shallower portions of the lake are covered with aquatic plants, among which the most conspicuous are the lotus (*nymphæa lotus*) and a floating plant called by the natives *fanna bellabago* or homeless fanna. A species of antelope, which Barth supposes to be the *antilope Arabica*, feed in large herds on the shores of the lake, and the native cattle thrive on its rich pasturage. The hippopotamus and crocodile wallow in great numbers in the shallow lagoons, and turtles and fish are abundant. The southern banks of the Tchad are flat and low, and are extensively inundated; but the northern are high and woody, and here elephants are found in vast herds. Water fowl are also numerous, principally of the duck tribe. There are extensive islands in the lake, which are densely inhabited by a pagan race called Biddoomahs, distinct from the surrounding Mohammedan tribes. (See BIDDOOMAHS.) The existence of this lake was known to Leo Africanus in the 16th century, but the first Europeans who visited it in more modern times were Denham and Clapperton in 1823, and Barth, Overweg, and Vogel in 1851-'5. Dr. Overweg died on its banks, Sept. 27, 1852.

TCHERNIGOV, a S. W. government of European Russia, province of Ukraine, bounded by Smolensk, Orel, Koorsk, Pultowa, Kiev, Minsk, and Mohilev; area, 21,250 sq. m.; pop. in 1856, 1,401,879. The surface, with the exception of the western portion, is flat, and the soil is particularly fertile. It is well watered by numerous streams, the most important of which are the Dnieper, which flows on the W. boundary, and its affluent the Desna, which intersects the government. Horses, horned cattle, and sheep are abundant, and the breeds of the two first are particularly good. Much honey and wax are obtained from bees; and locusts are often very destructive. The manufactures are confined chiefly to articles for domestic use. A large quantity of brandy is distilled. The largest place in the government is Nieshin, a manufacturing town.—TCHERNIGOV, the capital, on the Desna, 80 m. N. N. E. from Kiev, is one of the oldest towns in the Ukraine, and has a large trade; pop. 12,000. It was formerly held by the Tartars and Poles.

TCHIHATCHEF, Peter, a Russian geologist and naturalist, born at Gatchina, near St. Petersburg, in 1812. Early in life he was employed in the Russian bureau of foreign affairs, and between 1841 and 1844 was attached to the embassy at Constantinople. In the latter year he quitted the public service in order to devote himself exclusively to scientific pursuits, and soon after was commissioned by the government to explore the Altai mountains, of which he published an account under the title of *Voyage scientifique dans l'Altaï et dans les contrées adjacentes* (4to., Paris, 1846). His next undertaking was the scientific exploration of Asia Minor, which was accomplished, amid great perils and difficulties, in the space of 6 years. His time has since been mainly devoted to the preparation of his elaborate work, *L'Asie Mineure; description physique, statistique et archéologique de cette contrée*, of which only the first two parts, relating to the physical geography, climatology, and botany of the subject, have as yet appeared (2 vols. 8vo., Paris, 1853–'6, with atlas and plates). The remaining portion, treating of geology, statistics, and archæology, are in preparation. The author has also published in the transactions of scientific bodies many minor papers on subjects connected with his studies. He resides in Paris.

TEA (Chinese, *tcha*, *cha*, or *tha*), the dried leaves of several plants of the genus *thea*, belonging to the natural order *Ternströmiaceæ*. The plants are evergreen shrubs belonging to the same family as the camellias, and the two principal species of Linnæus, also recognized by Lindley, *T. bohea* and *T. viridis*, have also been called *camellia bohea* and *C. viridis*. They are now however only regarded as varieties of the *T. Sinensis*. The plants are bushy, with numerous leafy branches, and grow to the height of from 3 to 5 feet, and sometimes much higher. The leaves are 2 or 3 inches long and half an inch to an inch broad, of elliptical oblong shape, serrated except at the base, marked with transverse veins, of shining green color, and are supported alternately on short channelled foot-stalks. The flowers are white, of considerable size, and resemble those of the myrtle; they are either solitary, or 2 or 3 together on separate pedicels, at the axils of the leaves; calyx short, green, divided into 5 segments; corolla with 5 to 9 petals cohering at the base; stamens numerous, with yellow anthers; pistil with a 3-parted style; capsules 3-celled and 3-seeded. The two species are distinguished by botanists chiefly by the shape of the leaves. De Candolle admits but one species, with two varieties, viz.: the *viridis*, with "lanceolate flat leaves, 3 times as long as they are broad," and the *bohea*, with "elliptical, oblong, subrugose leaves, twice as long as broad." These specific names have no relation to the kinds of tea known as green and bohea, as both are produced from either one of the plants, as will be explained below. The plants are indigenous in China and Japan, and are said by the Chinese writers to have been first discovered in the hills of the central provinces, where they are still abundant. No certain allusion to tea is traced back further than the 9th century. Two Arabian travellers, as translated in the work of Renaudot, *Anciennes relations des Indes et de la Chine*, describe it as being in use as a beverage by the Chinese in the latter half of the 9th century. The Japanese, to whom the tea plant is almost as valuable as it is to the Chinese, affirm that the latter obtained it about the year 828 from Corea; but this is not credited. Tea was first made known in Europe by the Portuguese, who imported it early in the 16th century; and in 1589 a notice of it was published in the *Historia Indica* of Giovanni Pietro Maffei, and also by Giovanni Botero. Travellers in China and other eastern countries, in the early part of the 17th century, gave most extravagant accounts of the virtues of tea, which appears to have been in very general use at that time throughout a large portion of Asia. The Persians are described by Adam Olearius (1637) as boiling the leaves till the water acquires a bitterish taste and a blackish color, when they add to it fennel, anise seed, cloves, and sugar; the Hindoos, he adds, put it into seething water. About the same time the peculiar method of preparing it by the Japanese, which is still in practice, was described by Mandelslo of the Danish embassy; this consists in reducing the leaf to powder, and putting this into porcelain cups full of boiling water. The Dutch East India company introduced tea into Europe in the first half of the 17th century, and it was known several years previous to 1657 in England as a choice and very rare article in occasional great entertainments. It had long been the custom in European countries to make use of hot infusions of leaves as beverages, and in England those of the sage were much employed, and are even said to have been carried to China by the Dutch to be there exchanged for the Chinese tea leaf. Tea at that early period was valued at £6 to £10 a pound weight. It was offered for sale in 1657 by Thomas Garway, the founder of the London coffee house, still known as "Garraway's," at prices varying from 15 to 50 shillings a pound. He also sold it, in the infusion, "made according to the directions of the most knowing merchants and travellers into those eastern countries." This appeared in a printed sheet by Garway, entitled "An exact Description of the Growth, Quality, and Virtues of the Tea Leaf." In 1660, by act of parliament, tea, with chocolate and sherbet, was made subject to a tax of 8*d.* on every gallon made and sold. The article still continued very rare, as in 1664 a present of 2 lbs. 2 oz., costing 40*s.* a pound, was made to the king by the East India company; and two years afterward another present, also obtained from the continent, was made of 22¾ lbs., for which the directors paid 50*s.* a pound. In 1677 the East India company took the first step toward importing teas, in an order to their agents for teas of the best kind "to the amount of £100." There was received the next year 4,713 lbs., which seems to have glutted the market. The recorded import by the company for 6 years afterward was only 410 lbs.; but some tea appears to have been introduced through other means. About the close of the century the average importation amounted to about 20,000 lbs. a year; in 1703 to over 100,000 lbs., at an average value of about 16*s.*; and in 1721 it reached 1,000,000 lbs. Thus the tea trade rapidly grew to great importance, and the article being regarded as one of luxury rather than of necessity, it was made the subject of enormous duties, which, while they added largely in the 18th century to the revenues of the kingdom, led to an extensive system of smuggling, and also to adulteration of genuine and fabrication of counterfeit teas. The East India company had the monopoly of the trade until it was thrown open on April 22, 1834, with low duties, ranging from 1*s.* 6*d.* to 3*s.* a pound. The importations of 1833 amounted to 32,057,852 lbs., and those of 1835 to 44,360,550 lbs. In 1859 the receipts were 83,500,000 lbs., which, at the present duty of 1*s.* 5*d.* per pound, yielded a revenue of £5,914,000. The extent of the trade in the United States will be noticed at the close of this article.—The range and cultivation of the tea plant is over a large portion of China between lat. 20° and 40° N., extending east over the Japan islands, and stretching west about the 30th parallel to Nepaul and the Himalaya. The most important district in China is near the coast from about lat. 25° to 32°, or to Shanghai. The productive districts in China are Fo-kien and Canton for black tea, and Kiang-nan, Kiang-si, and Che-kiang for green. The most important of these are Fo-kien and Kiang-nan. Robert Fortune, the botanical collector to the horticultural society of London, observed that both the black and green teas of the northern districts are obtained from the *T. viridis*, while those of both sorts shipped from Canton are produced from the *T. bohea*. Tea is also an important product in Japan, Tonquin, and Cochin China. The plant is also cultivated in the mountainous parts of Ava. In the mountains which separate China from the Burmese territories the tea plant is indigenous, and abounds especially in Upper Assam, bordering on the province of Turman. Its culture has been encouraged by the government of British India in the N. W. provinces and the Punjaub. In Nepaul, lat. 27° 42′ N., the plant is cultivated at an elevation of 4,784 feet above the bay of Bengal. The tea from these districts sometimes brings in India from $1.50 to $1.75 per pound. The Dutch have introduced the culture with considerable success upon the hills of the island of Java. The plant has been introduced into Brazil, and, with the assistance of Chinese laborers, some tea has been produced near Rio Janeiro. The cultivation of tea in the United States was attempted at Greenville, in the mountainous parts of South Carolina, by the late Dr. Junius Smith, from 1848 to 1852. He imported plants of 5 to 7 years' growth from China, and stocked a small plantation with them in that region, where they were exposed without injury to severe frosts during the winters, and to snow which covered the ground 8 or 9 inches deep. From his experiments it would appear that the climate and soil are very well adapted to the cultivation of the plant; but the want of experienced labor, and the abundance of other more profitable employments, will probably long prevent the culture from attaining any importance in this country. It may perhaps soonest succeed in California, where Chinese laborers can conduct the manipulations, and the processes may be simplified and economized by the introduction of improved apparatus and machinery. But although the high cost of transportation from the interior districts of China to the coast, and the long sea voyage to the United States, are important points in favor of introducing the culture into the United States, there are on the other hand to be considered the extremely low cost of labor in China, which is worth only from $3 to $4 per month, and that this is the chief item of expense in the production of tea. Ordinary congou tea in the tea-producing districts is rated at from 6 to 8 taels per picul, or from 8 to 9 cts. per pound. The packing and transportation add to this about 3 cts., and the export duties and charges about 3 cts. more, making the cost to the shippers about 15 cts. So it appears that even with a high protective duty there is little probability that the culture could be made profitable. The districts of southern China are mostly of a mountainous character, and too rocky to be much cultivated. It is not until passing the sterile granitic regions that the more fertile districts devoted to the tea culture are met with further north, near the river Min, in the provinces of Fo-kien and Che-kiang. The lands here spread out into broad plains, some of which are at a lower level than the surface of the rivers and canals which pass through them, but the soil of these is usually a stiff clay, more unproductive than the soil of plains elevated a few feet above the level of the rivers and canals, as is the case with much of the cultivated lands of Shanghai. The tea carefully cultivated upon these plains is known as "garden tea," while that grown upon the more elevated lands is called "hill tea." In several of the provinces very good tea is produced upon hills where the soil is rich. The geological formations in some of the districts are granitic, and in some they consist of silurian slates with red calcareous sandstone, and in the bohea tea lands of Woo-e-shan of clay slate, associated with beds of quartz cut through by dikes and veins of black granite, and overlaid by sandstones and conglomerates composed of quartzose grains and pebbles held together by a calcareous paste. The hillsides in this region often present nothing green excepting the tea shrubs.—The soil best adapted for the growth of the tea plant is a light loam more or less stony, containing considerable vegetable matter, and which, while retentive of moisture, is at the same time well drained, and sufficiently porous to be permeable to the delicate fibres of the roots. The seeds, gathered in October, are kept in sand till the next spring, when they are sown either in the rows in which they are to grow, or in a bed from which they are afterward transplanted to the tea fields. The seeds are planted 6 or 8 together in holes ranged in rows about 4 feet apart, and as the plants germinate, if the season is dry, they are watered with water in which rice has been washed, and sometimes treated with liquid manure or the dung of silkworms. Water lodging about the roots is apt to destroy the plants, and manure is thought to impair the flavor of the tea. In the winters, if the cold is severe, the young tender shrubs are often protected by a wrapping of straw around them. The first gathering of the leaves does not take place until the second or third year. The young leaf buds are sometimes gathered early in April, for the kind of tea known as pekoe, which is the choicest of black teas. The plants might be seriously injured by the loss of the young buds, but for the copious rains which fall about this season. New leaves soon appear, and these, gathered the last of April or early in May, constitute the most important crop. The third gathering, early in July, furnishes leaves of inferior quality. In some parts of the country a fourth crop is gathered in August or September, of large and old leaves of little value. The duration of the plants is 10 or 12 years, when they are dug up, and replaced by seedlings. The leaves are stripped off rapidly without much care, into baskets of split bamboo, and are carried to the building where, after being sorted, they are subjected to the drying process. The buildings used for this purpose appear to be low sheds more or less open at the sides, and furnished within with rows of pans in stacks of brickwork. The drying is variously conducted according to the quality of the tea, some kinds being exposed to the open air in shallow pans, some being tossed up in the air, and some, too choice for handling, are whirled round in sieves. They are then exposed in the pans to sufficient heat to dispel their moisture without impairing the aroma of the tea, and this is effected by a person tending each pan and keeping the leaves constantly in motion with his hands. A brisk fire of dry wood is kept up under the pans during this roasting process. In a few minutes the leaves become soft and pliable and moist upon the surface. They are then thrown upon a table of split bamboo, and a number of workmen around take them up in their hands and roll them, by which they acquire the curled form common to the commercial tea. As soon as this is done, the leaves are exposed upon a bamboo screen to the action of the air, when they are again roasted with less heat over a charcoal instead of a wood fire. They are again rolled, and sometimes the processes are again repeated. The final drying is commonly in the pans, of the finest sorts at a very gentle heat over a charcoal fire. The difference between green and black teas is owing to the longer exposure of the latter to the air before the drying, and during the different stages of the drying process. Instead of the leaves being taken directly to the drying pans, they are left, if intended for black tea, spread out sometimes a whole night on bamboo mats, and are afterward tossed about and exposed to the air. The heating and rolling processes may also be repeated as many as 4 times; and the final drying is slowly conducted, a workman opening and stirring the leaves with his hands to afford free passage to the vapors. The effect of this is to induce a partial fermentation and oxidation of the leaves, accompanied with a change of color to black. By rapid drying, with the least exposure to the air, the leaves not only remain green, but they retain more of the active properties of the plant, as appears from the greater effect of green teas upon the nervous system. It is also stated that the difference between green and black teas is owing in part at least to difference of soil, climate, and age of the leaves, the plants furnishing the black teas being grown in hilly and mountainous places, and the green tea shrubs being cultivated on level lands, in soils enriched with manure. Some of the varieties of green tea are produced by sorting a single kind by sifting through sieves of different sizes, and the finer kinds thus separated are sometimes roasted after this 3 or 4 times. Since the great demand for green teas for the United States in 1832 and 1833, the Chinese have been in the habit of artificially coloring inferior or damaged black teas, so as to make them pass for the higher priced green teas, and by similar methods of improving the color of the poorer sorts of green tea. As witnessed by Sir John Davis, the method of coloring consists in first stirring among the leaves, while heated in the pans, a little pulverized yellow turmeric, and then adding a mixture of finely pulverized Prussian blue and gypsum. Indigo and porcelain clay are also used for this purpose. To such an extent is this adopted, that it is believed that all green teas exported from China are glazed or colored; and according to Dr. Hassall, when they are not colored there is little to distinguish green from black tea, the chief difference in color being that the former is sometimes inclined to olive. Some varieties of black teas, as the scented caper or black gunpowder and orange pekoe, are also made to present a peculiarly smooth and glossy appearance by rolling the leaves with pulverized graphite or black lead. None of these fine varieties are ever found in England otherwise than adulterated, but the souchong and congous are generally free from this deception.

The Chinese also employ other methods of adulteration, as intermixing other kinds of leaves with those of the tea plant, such as leaves of the ash, plum, &c. This too is practised chiefly with the green teas; and they even manufacture a spurious article, which they call themselves lie tea, and so brand the chest containing it, made up of the dust of tea and other leaves, and sand, which by means of starch or gum they cause to cohere in little masses; these they paint and color with great skill to imitate either black or green gunpowder tea. Lie tea is also mixed with other teas of low quality, the proportion being certified to by the Chinese merchant who disposes of them. It may be detected by the leaves not unfolding when steeped in boiling water. It was stated in evidence before the parliamentary committee in 1856, that the importations of lie tea into England amounted to £400,000 or £500,000. From other evidence presented to this committee, it would appear that the English vie with the Chinese in the variety and ingenuity of their adulterations of tea. They employ a greater number of foreign leaves and of coloring matters, some of which are much more dangerous from their poisonous qualities than those used by the Chinese. Some of these falsifications may be readily detected by washing away the soluble matters from a sample of the tea exposed to a gentle stream of cold water, and also by burning another sample and comparing the weight of its ash with that of teas of undoubted character. While the ash of genuine teas amounts to from 5 to 6 per cent., that of adulterated teas has been found of various weights up to 45.5 per cent. Another fraudulent practice is to cause teas which have been once used and exhausted of their virtue, to assume again the appearance of fresh tea. This has been carried on in England by collecting the exhausted leaves from hotels and coffee houses, and redrying them, treated with gum water, in establishments devoted to this business. The leaves are then sold to be intermixed with genuine teas, or they are artificially colored and glazed to be sold as green tea. In order to communicate an agreeable scent to tea, the Chinese mix with some kinds the leaves of sweet-scented flowers, such as *chloranthus inconspicuus*, *olea fragrans*, and others. The flowers are dried, powdered, and sprinkled over the tea, or the fresh flowers are arranged in alternate layers with the tea leaves, when both are roasted till the flowers become crisp. In either case they are finally removed by sifting. The tea farms in China seldom produce more than 600 chests of tea each. The crops are bought up by tea merchants, who collect together from different farms enough for 620 or 630 chests, which they mix together, roast again, and then pack in chests for transportation. The next merchant who buys the tea puts upon the chests some mark that is in good repute, and sends them forward to the shipping ports, toward which the transportation through some of the districts is by men who carry the chests slung one at each end of a bamboo, which rests across the shoulder. But if the tea is of superior quality, a single chest is fastened at the ends of two bamboos, and is thus carried upon the back of a man; the other ends of the bamboos project in front, and are tied together. By placing these ends upon the ground and raising them to a perpendicular position, the cooly is relieved of the weight of the chest as he stops to rest in ascending the steep mountain passes; and wherever he stops he sets the chest in this manner against the wall, never allowing it to be defaced nor the tea injured by the chest touching the ground. From the bohea countries to Canton the transportation is effected by a number of portages alternating with shipments in boats, occupying altogether from 6 weeks to 2 months. From the same region to Shanghai by similar means the distance of 620 miles is accomplished in about 28 days.—The soluble constituents of tea contained in its infusion consist of gum, grape sugar, a large proportion of tannin, a volatile oil, and a peculiar nitrogenized principle called theine, which is the same as that found in coffee and in the Paraguay tea or maté, or holly, of which an account has been given in the article CAFFEINE. The theine forms but a very small proportion of its substance, the largest quantity that has been separated not exceeding 6 per cent. Stenhouse rated its proportion in the teas of commerce at about 2 per cent. In the analyses of G. J. Mulder its proportion is doubtless underrated; these are as follows:

Constituents.	Chinese.		Javanese.	
	Hyson.	Congou.	Hyson.	Congou.
Volatile oil	0.79	0.60	0.98	0.65
Chlorophyl	2.22	1.84	3.24	1.28
Wax	0.28	..	0.32	..
Resin	2.22	3.64	1.64	2.44
Gum	8.56	7.28	12.20	11.08
Tannin	17.80	12.88	17.56	14.80
Theine	0.43	0.46	0.60	0.65
Extractive (by water and hydrochloric acid)	46.40	40.48	42.04	36.52
Albumen	3.00	2.80	3.64	1.28
Vegetable fibre	17.08	28.32	18.20	27.00
Saline residue	5.56	5.24	4.76	5.36
Total	104.34	103.54	105.18	103.06

The aroma and flavor and some of the effects of tea upon the nervous system are mainly due to the volatile oil. This is developed in the roasting and drying, and its effects are most strongly exhibited in new teas. Those persons whose business it is to inspect teas, which they do by tasting, and are known as tea tasters, are subject to frequent attacks of headache and giddiness, and paralysis is a common complaint with those employed in packing and unpacking chests of tea. Theine is regarded as lessening the waste of tissue, and consequently taking the place of other food. Tannin imparts to the tea its astringent taste and property, and causes it to exert a slightly constipating effect upon the bowels. When fully extracted by long continued steeping, it is then very perceptible by the bitter taste which it imparts to the tea. The glutinous matters are lost with the leaves unless these are consumed with the infusion after the practice of the Japanese, who reduce the leaves to powder. An addition of soda would cause more gluten to appear in the infusion.—The virtues of tea have been highly extolled from the time of its earliest use as a beverage. Lo Yu, a learned Chinese who lived in the dynasty of Tang, A. D. 618 to 906, says of it: "It tempers the spirits and harmonizes the mind; dispels lassitude and relieves fatigue; awakens thought and prevents drowsiness; lightens or refreshes the body, and clears the perceptive faculties." These effects are true of tea taken in moderate quantity, and its soothing influence is such that it is frequently beneficial in inflammatory diseases, and a strong infusion of tea relieves nervous headache. But when taken in excess it acts as a narcotic upon some constitutions, producing nervous tremblings; and in inferior animals it has been known to produce paralysis. Green tea is much more objectionable in this respect than black.—The principal black teas imported into the United States during the last 10 years, in the order of their relative quantities, are oolong and ningyong, souchong and congou, pouchong, orange pekoe, and pekoe. The green are young hyson, gunpowder, imperial, hyson, twankey, and hyson skin. The average net weight of a chest of tea is about 64 lbs., which is the weight of congou tea; pekoe and hyson weigh usually 49 lbs., and bohea 133 lbs. The twankey, which is of the lowest quality, is largely used for mixing with better teas, and is said to constitute ¾ of all the green teas imported into Great Britain. Hyson skin is the refuse of the finer hyson, and is largely purchased by American merchants. Gunpowder is so named from the granular appearance of the leaves, which are rolled with particular care; the Chinese name for it means pearl tea. Young hyson is so named from the early season in which its leaves are gathered; as very inferior teas have been passed off for this, its reputation is now lost.—The exportation of tea from China is from 3 ports only, Shanghai, Foochow, and Canton; and the principal portion of the exports to the United States is from the first named, the most northern of the 3 places. The countries which take nearly the whole of this product are Great Britain, the United States, Russia, and Holland. In 1852 the exportations were as follows: Great Britain, 65,137,200 lbs.; the United States, 34,334,000; Australia, 3,829,000; Holland, 3,000,000; India, 500,000; other places, 2,200,000. It is supposed that from 14,000,000 to 15,000,000 lbs. are annually sent overland to Russia. The trade with the United States first attained any importance in 1790, and up to the close of the year 1800 the imports averaged 2,500,000 lbs. per annum; for the next 12 years 3,850,000 lbs.; and to the end of 1820 there was but little variation from this. From that time to the end of 1833 the consumption, ascertained by deducting the exports from the imports, averaged about 7,000,000 lbs.; from that time to the close of 1841 the average annual consumption was 12,752,163 lbs. The consumption has been chiefly in the N. E. portion of the United States, tea being used exclusively in some of the most northern portions, the use of coffee gradually increasing toward the south, till in some parts of the southern states tea is entirely unknown. At the west also tea is less used than coffee. The following table presents the exports from China to the United States for the years named, as prepared by United States merchants in China, reckoning to July 1 of each year:

Years.	Green tea, lbs.	Black tea, lbs.	Total, lbs.
1854-'55......	21,669,500	8,572,900	30,242,400
1855-'56......	24,314,500	15,219,300	39,533,800
1856-'57......	17,403,200	7,888,900	25,292,100
1857-'58......	17,528,400	11,726,900	29,255,300
1858-'59......	18,000,800	12,172,300	30,173,100
1859-'60......	18,234,200	13,428,200	31,662,400
1860-'61......	8,851,200	19,338,100	28,189,300

The imports, deliveries, and exports of tea in and from the United Kingdom were as follows for the years named:

Years.	Imports.			Delivery.			Of which exported.
	Green, lbs.	Black, lbs.	Total.	Green, lbs.	Black, lbs.	Total.	
1849..............................	9,166,000	43,234,000	52,400,000	9,936,000	45,364,000	55,300,000	5,200,000
1850..............................	8,427,000	40,873,000	49,300,000	10,161,000	46,239,000	56,400,000	5,400,000
1851..............................	9,286,000	62,214,000	71,500,000	9,095,000	49,405,000	58,500,000	4,700,000
1852..............................	9,314,000	55,386,000	64,700,000	9,288,000	52,512,000	61,800,000	6,700,000
1853..............................	11,249,000	58,451,000	69,700,000	9,038,000	54,362,000	63,400,000	4,900,000
1854..............................	8,601,000	70,099,000	78,700,000	9,731,000	60,469,000	70,200,000	9,000,000
1855..............................	13,030,000	70,270,000	83,300,000	10,775,000	67,225,000	78,000,000	15,000,000
1856..............................	10,594,000	77,147,000	87,741,000	9,528,000	59,713,000	69,241,000	6,241,000
1857..............................	12,713,000	51,780,000	64,493,000	12,229,000	66,531,000	78,760,000	9,600,000
1858..............................	8,334,000	65,666,000	74,000,000	11,868,000	69,132,000	81,000,000	8,000,000
1859..............................	8,043,000	62,457,000	70,500,000	10.975,000	72,525,000	83,500,000	7,200,000

—Useful works of reference on the subject of tea are: "The Chinese," by Sir John F. Davis (1840); "The Cultivation and Manufacture of Tea in China," by S. Ball (8vo., London, 1848); "Three Years' Wanderings in the Northern Provinces of China," by Robert Fortune, botanical collector to the horticultural society of London (1847); "Two Visits to the Tea Countries of China and the British Tea Plantations in the Himalaya," by the same (1853); "The Middle Kingdom," by Dr. S. Wells Williams (2 vols. 8vo., 4th ed., 1857); "Report on the Government Tea Plantations in Kumaon and Gurwhal," by William Jameson, superintendent of botanical gardens, N. W. Provinces, India, in the "Journal of the Agricultural and Horticultural Society of India" (vol. vi., Calcutta, 1848).

TEA, Paraguay. See Holly.

TEACHERS' INSTITUTE, in the United States, an assemblage of the teachers of the public schools of a county or part of a county, for a period of from 2 to 4 weeks, usually in the spring or autumn, for the purpose of receiving instruction in the art and methods of teaching, by lectures, conferences, and class drills, from experienced practical teachers. The instruction is free, and the families of the town or village where the institute is held usually receive those who attend as guests during its session. The first teachers' institute was organized by the Boston academy of music, in Aug. 1834, for "instruction in the methods of teaching music." The first application of it to the instruction of teachers of public schools was made by Mr. Henry Barnard at Hartford, Conn., where in the autumn of 1839 a class of 26 young men, and in the spring of 1840 a class of 16 young women, were taught. Institutes have assembled in New York since 1842 or 1843, and an appropriation was made for their support from the state treasury in 1847; in Massachusetts, Rhode Island, and Ohio since 1845; in Pennsylvania since 1851; and they were commenced about the same time in Indiana, New Hampshire, and New Jersey, and the other northern states, where legislative provision is generally made for defraying their expenses. The instruction in these temporary training schools is necessarily almost wholly oral; and as there is neither time nor occasion for lessons in the studies to be taught in the public schools, it is confined to an explanation and illustration of the best methods of teaching and governing schools. Those who conduct the institutes have usually had large experience in teaching, being often the principals or professors in the normal schools. The lectures are practical, and usually on some particular educational topic, such as physiology, grammar, physical geography, modes of discipline, &c. Conferences are held, in which the teachers relate their own experience of particular methods of instruction and discipline.

TEAK WOOD, a variety of timber much used in ship building and house carpentry in the East. It is the product of the *tectona grandis* and other species of large forest trees of the mountainous districts of the Malabar coast, of Burmah, and of various islands in the Indian seas. The tree of the common species grows to an immense size, the leaves from 12 to 24 inches long and from 8 to 16 inches broad, and furnishes single sticks of timber sometimes 50 feet long and 2 feet square. Of all the timber obtained in the East, this is esteemed most valuable. The wood is of light brown color, and works easily, although, containing much silicious matter, it is somewhat destructive to tools. Its weight to the cubic foot, when moderately seasoned, is from 45 to 52 lbs., as obtained from Malabar; but some inferior sorts from other places weigh only about 42 lbs. While the timber possesses the strength of oak, it is much more durable. It seasons quickly, shrinking very little, and is not liable to dry or wet rot, even if used directly from the forest. It contains a resinous oil, which protects it alike from decay and from the attacks of insects. The Burmans extract this oil by tapping the trees, and use it chiefly for protecting their pagodas from the weather; but the timber thus exhausted of its oil is injured as respects its durability. Teak is largely exported to Calcutta and Madras from Maulmain, obtained from the extensive forests in its vicinity, and much is consumed in ship building in that locality. The teak of Malabar, which is esteemed the best, is extensively used in the ship yards at Bombay. At the great exhibition of 1851 in London, the naval department of the East India company contributed specimens of more than 70 species of teak. —The timber known as African teak, brought from the W. coast of Africa, belongs to an entirely different genus of trees, and is greatly inferior to the East Indian teak. It has been supposed to be a *vitex*, and by some to belong to the *euphorbiaceæ*.

TEAL, the common name of the small river ducks of the genera *nettion* (Kaup) and *querquedula* (Stephens), called *sarcelles* by the French. In the genus *nettion* the bill is as long as the head, straight, unusually narrow, with sides parallel, high as broad at the base, the depressed tip with a very narrow nail; wings moderate and pointed, 2d quill the longest, and the secondaries lengthened and pointed; tail moderate and wedge-shaped; toes united by a full web, the hind one short and slightly lobed. There are about 20 species, distributed all over the globe, though most numerous in the northern hemisphere; they are migratory, commencing their rapid flights in small flocks soon after sunset, resting by day on the surface of fresh water or the reedy shores of rivers and lakes, and feeding principally at night on aquatic insects and worms, seeds, and grains; the nest is made of a large mass of decayed vegetable matter lined with down, and the eggs are 8 to 10; they are highly esteemed as game. The European teal was domesticated by the Romans, and might be by the moderns with proper attention to its food and habits, making a very handsome and profitable addition to the poultry yard. The green-winged teal (*N. Carolinensis*, Baird) is 14 inches long, 22 to 24 in alar extent, and the bill 1½; the head and neck are chestnut, the chin black, and the forehead dusky; around the eyes and on the sides of the head is a broad rich green stripe, passing into a bluish black patch on the nape; below white, with rounded black spots on throat; lower neck, sides, and scapulars finely banded with black and grayish white; speculum on wings broad and rich green; a white crescent in front of bend of wings; under tail coverts black, with a patch of buff white on each side; wing coverts plain olive gray; in the female the under parts are white, and the upper dark brown with gray edgings. It occurs over the whole of North America, and accidentally in Europe; it migrates principally over the land, breeding from the great lakes to the fur countries; it runs well, is a good swimmer and diver, and a very rapid and graceful flier; having a comparatively long neck, it feeds while swimming, and, being choice in its selection of food, affords a delicious flesh, much superior, according to Audubon, to that of the canvas-back; it is not very shy; the eggs are 1¾ by 1⅜ inches, much rounded, dull yellowish with indistinct deeper tints. The English teal (*N. crecca*, Kaup) differs from the above in having no white crescent in front of the bend of the wings; the elongated scapulars are velvet black externally and creamy white internally; this has occasionally been observed on the E. coast of the United States.—In the genus *querquedula* the bill widens a little to the end, which is obtusely rounded, is higher than broad at base, has a wider nail and the lamellæ visible on the sides. There are about half a dozen species in North America, Europe, and Asia, with habits similar to those of the other genus. The blue-winged teal (*Q. discors*, Steph.) is 16 inches long, 24 or 25 in alar extent, with a bill of 1⅞; the head and neck above are plumbeous gray; top of head black; white crescent in front of eyes; under parts purplish gray, each feather spotted with black; fore part of back brownish with 2 narrow bands of purplish gray; back behind and tail greenish brown; under tail coverts black; outer webs of some of the scapulars and the wing coverts bright blue; greater coverts tipped with white, with grass-green speculum below them; bill black; in the female the top of the head is brown, chin and throat yellowish white, back brown with paler edgings, under parts whitish with obscure brown spots, and the same blue and white in the wings as in the male. It is found throughout eastern North America to the Rocky mountains, but not in Europe; it is very abundant about the mouths of the Mississippi in winter, and is less hardy than the green-winged species; the flocks pass and repass many times over a place before alighting, and the glistening of their wings in the sun is like that of polished steel; it is easily kept in captivity, thriving on coarse corn meal, and could be domesticated with a little care. This species is replaced west of the Rocky mountains and on the Pacific coast by the red-breasted teal (*Q. cyanoptera*, Baird), a larger bird, of a general purplish chestnut color, without white on the head or tail; the feathers of the flanks are uniform chestnut.

TEARS, the limpid, colorless, slightly saline secretion of the lachrymal glands, continually poured out in quantity sufficient to bathe the surface of the eyes, to secure the easy and free motion of the lids, and to wash off any irritating particles from their sensitive membrane. The lachrymal belong to the aggregated glands, or those in which the vesicles or *acini* are arranged in lobules; there is one situated at the upper, external, and anterior part of each orbit, in a depression of the frontal bone, in relation with the external rectus muscle, resting behind on a fatty areolar tissue; each gland is of the size of a small almond, of reddish white color and flattened form, enveloped in a fibrocellular capsule, and receiving an artery, vein, and nerve of the same name; the secretion is poured out by 6 or 7 trunks opening within the upper lid. At the inner angle of the eyes, in both lids, are 2 very narrow, always open apertures, the lachrymal *puncta*, situated in the middle of a slightly prominent tubercle, about 1½ lines from the inner junction of the lids; they are opposite each other, the lower turned up and the upper down, and both outward and backward. Through these openings the tears are conveyed by the short lachrymal ducts in each lid to the lachrymal sac, situated at the inner angle of each eye, in the bony groove between the lachrymal bone and the ascending process of the superior maxillary; it is a small membranous sac, opening below into the nasal duct, which conveys the tears into the nose beneath the inferior turbinated bone, explaining why after a copious secretion of tears it becomes necessary to blow the nose. At the inner angle of the lids, in front of the globe and behind the lachrymal points, is a small reddish tubercle, pyramidal with the summit turned forward and outward; this is the lachrymal caruncle, and consists of a mass of small mucous follicles, covered by the conjunctiva, which forms in front and to the outside a semilunar fold, called the nictitating membrane; this is rudimentary in man, but remarkably developed in birds. The act of crying, generally accompanying an increased secretion of tears, as far as the movements of respiration are concerned, is very nearly the same as that of laughing, though occasioned by a contrary emotion; the expiratory muscles are in more or less violent convulsive movement, sending out the breath in a series of jerks, accompanied by well known sounds; in children the act is sometimes continued almost to the complete emptying of the chest of air, to the great dismay of parents, but the *besoin de respirer* is always stronger than the convulsive muscular movements. Moderate excitement, whether of joy, tenderness, or grief, increases greatly the quantity of the tears, though the secretion is checked by violent emotions; in intense grief the tears do not flow, the restoration of the secretion being a sign of moderated sorrow, and itself affording relief by the resumption of nervous action previously held in abeyance by great mental depression. Considering their size, there are no other glands which ordinarily can so increase the amount of their secretion as the lachrymal; the quantity is sometimes very great, and very easily stimulated; the shedding of tears is also decidedly contagious, and it is for most persons difficult to see any one weeping without feeling their own eyes fill with tears.—The lachrymal gland is rarely diseased, though it is subject to inflammation, and to morbid growths, for which it has been extirpated. *Xerophthalmia* is a disease in which the eyes are dry from deficiency of the tears or of the mucous secretion; the best remedy is bathing the organs by means of the eye cup with tepid water. In *epiphora* the tears are secreted so abundantly that they run over the cheeks, the lachrymal ducts not being able to convey them off fast enough; it is not uncommon in scrofulous persons with very irritable eyes, and is best treated by alteratives and tonics, with soothing and gently astringent applications; this symptom is sometimes caused by foreign bodies or inverted lashes. The lachrymal puncta may be closed, causing the tears to flow over the cheeks, for which the remedy is dilatation by fine probes. When the nasal duct is obstructed, the eye is watery and the corresponding nostril dry, the sac forming a small tumor at the side of the nose; the sac also may be inflamed, with pain, tenderness, swelling, and feverish symptoms; this may end in suppuration and an external opening, constituting lachrymal fistula, requiring the restoration of the obliterated duct by styles of different materials, as described in surgical works.

TEASEL (*dipsacus fullonum*), a European plant, greatly improved by cultivation, used for dressing cloths. It has a fleshy root which branches and tapers; an erect, furrowed, prickly stem, branching near the top, 5 or 6 feet high; sessile, entire leaves, spiny on the margins and surfaces, those of the stem opposite and joined at base, and generally filled with water, whence its generic name *dipsacus* (Gr. διψακος, thirsty). The disposition of the flowers reminds one of the composite order, being numerous and collected upon a cylindrical head; but from certain structural peculiarities the teasels and the scabiouses form a distinct natural order termed *dipsacaceæ*. The corolla is monopetalous, tubular, 5-lobed, of a whitish color, the stamens having pale purple anthers. Rigid, spiny scales, recurved at the apex, surround each floret; and when the flowers have faded, the dried and ripened receptacles are gathered and selected with great care, being assorted according as they are terminal, lateral, or secondary growth, the first being the best for use. The head forms a sort of brush which is found to be better adapted for raising the nap on woollen fabrics than any artificial substitute that has been contrived. The teasels are attached when in use to the periphery of a large, broad wheel, which is made to revolve so as to bring them in contact with the surface of the cloth. The profits from teasel culture are very uncertain, much depending upon the weather and on the condition of the soil.—The wild teasel (*D. sylvestris*, Miller), supposed to be the original of the cultivated kind, is a common plant by roadsides and near hedges, and is sometimes found in similar spots in the United States, being however adventitious.

TECUMSEH, a North American Indian, chief of a tribe of the Shawnees, born on the banks of the Scioto river, near Chillicothe, O., about 1770, killed in the battle of the Thames, C. W., Oct. 5, 1813. He was one of 3 brothers brought forth at the same birth. The others were Kumshaka, who probably died young, and Elskwatawa, better known as the prophet. An engagement with Kentucky troops which took place on Mad river, when he was perhaps not more than 20, is the first fight with white men at which Tecumseh is known to have been present, and it was reported by some of his tribe that he then ran at the first fire; yet in the war that ended with the treaty of Greenville in 1795, he became celebrated as one of the boldest and most active of the Indian warriors. About 1804 he formed, in conjunction with his brother the prophet, a project to unite all the western Indians in a defensive alliance against the whites. Tecumseh visited all the tribes on the W. bank of the Mississippi, and upon Lakes Superior, Huron, and Michigan, and the prophet pretended to be commissioned to the Indians from the Great Spirit and began to preach against the influence of the white men. Both had considerable success, and in 1811 the prophet had finally gathered around him at Tippecanoe on the Wabash a force of several hundred warriors. Governor Harrison's investigations in relation to this force brought on the battle of Tippecanoe, Nov. 7, 1811, in which the Indians were defeated. Tecumseh's plan was not yet mature, and this battle ruined it. His next endeavor was in the alliance with the English. He received the rank of brigadier-general, commanded all the Indians who coöperated with the English in the campaigns of 1812–'13, was present at every important action previous to that on the Thames, and took a conspicuous part in the skirmishes that preceded Hull's surrender of Detroit. In the battle on the Thames, near the Moravian towns, he commanded the Indian and English right wing, and was posted in the only part of it that was engaged with the U. S. troops. The Indians were driven back, but Tecumseh rushed forward where the American fire was thickest and fell. He was generally said to have been shot by Col. R. M. Johnson, afterward vice-president of the United States; but there was never any foundation for the statement, and it is now no longer credited.

TEETH, the organs in vertebrates for the seizure and mastication of food, placed at or near the entrance to the alimentary canal. In adult man there are 32, 16 in each jaw, implanted in sockets, and of an irregular conoid form; in the child there are only 20. For their development see Dentition. Their number increases in the lower animals, being greatest in the cetaceans and marsupials among mammals, and also considerable in many reptiles and fishes. The portion of a tooth above the socket is called the crown, the concealed part the root or fang, between these being a more or less well marked constriction or neck. Vertebrate teeth, like bones, have for their earthy basis phosphate of lime, the enamel also containing fluate of lime; the teeth of invertebrates consist essentially of carbonate of lime. The body of a tooth is composed of a tissue called dentine, the outer crust of the cement or *crusta petrosa*, with generally a thin covering of enamel on the grinding surface. Dentine is disposed in the form of very minute cells and tubes of an animal gelatinous basis, containing the earthy matter, some of its varieties closely resembling bone; the cement corresponds in texture with the osseous tissue of the animal, forming nearly ½ of the mass of the elephant's molars, and wearing away sooner than the dentine; the enamel is the hardest constituent of the tooth, and the hardest of the animal tissues, consisting of the earthy matter contained in the canals of an animal matrix.—There are 3 kinds of teeth distinguishable in mammals, viz., incisors, canines, and molars. The incisors are situated in the front and median portion of the jaws, and have a simple flattened root and a thin cutting edge, suitable for dividing and collecting food, as in the jaws of the beaver and squirrel and in the lower jaw of the ox. The canines, 4 in number, are next to the incisors, separated from them by an interval, except in man; the crown is conical, and the root long and simple; they are the so called eye and stomach teeth in man, and form a striking character and very formidable weapons in the carnivora; they are best adapted for securing and tearing a living prey. The molar teeth are the most posterior, and have flattened and tuberculous crowns suited for grinding down vegetable food; they are most developed in herbivorous animals; the roots in man are often much bifurcated, rendering extraction difficult.—Teeth are so intimately related to the food and habits of animals, so easily examined from their situation, and of such indestructible materials, that they are of the first importance in the classification of animals, both living and fossil. The importance of the teeth in preparing food for the digestive process has been noticed under Digestion; in man they are also subservient to beauty and to speech; when fully formed they are subject to decay, but have no inherent power of reparation; they may increase by abnormal growth of the cement, their most highly organized constituent. For the diseases and the mode of treatment of the teeth, see Dentistry.—In fishes the teeth vary from none in the sturgeon and lophobranchs to countless numbers in the pike and the siluroids; they are usually conical, but sometimes flattened or pavement-like, villiform, serrated, and cutting; they may be situated on any of the bones of the oral cavity, on the tongue, and in the pharynx; in most cases they are firmly united to the jaws by continuous ossification, but in some are movable; they are composed of dentine and its modifications, enamel occurring in only a few cases, like the parrot fish (*scarus*); and they are frequently shed and renewed, the germs being developed from the free surface of the buccal membrane. Among reptiles, the whole order of chelonians (tortoises and turtles), and also the toad family among batrachians, are without teeth; in the others these organs are usually simple, and adapted for seizing and holding but not chewing their food; the number is never so small nor so large as in fishes, and is rarely characteristic of species; they are generally conical, sharp, and smooth, and may be placed on any of the bones entering into the structure of the mouth; the base never branches into diverging fangs, and in most is anchylosed in various ways to the bone which bears them, as noticed under the different families; dentine and cement are always present, and sometimes enamel, as in the saurian crown. Among mammals, some of the edentates, as ant-eaters and pangolins, have no teeth; in the others they are implanted in sockets, and the molars have 2 or more roots when they have a limited growth; they are confined to the superior, inferior, and intermaxillary bones, a single row in each. Mammals have been divided by Owen into monophyodonts, or those which generate a single set of teeth, and diphyodonts, or those which generate 2 sets of teeth; the former include the monotremes, edentates, and carnivorous cetaceans, and the latter all the other orders. The teeth of mammals and their dental formulas have been sufficiently described in their respective divisions.—For full details on this subject the reader is referred to the following writings of Prof. Richard Owen: "Odontography" (London, 1840–'45); article "Teeth" in vol. iv. of the "Cyclopædia of Anatomy and Physiology" (1852); and "The Principal Forms of the Skeleton and Teeth," in vol. i. of Orr's "Circle of Sciences" (London; reprinted in Philadelphia, 1854).

TEETH, Mineral. See Dentistry, vol. vi. p. 396.

TEFFT, Benjamin Franklin, D.D., LL.D., an American clergyman, born in Oneida co., N. Y., in 1813. He commenced a course of classics and mathematics at an early age, and at 15 entered upon the study of law, but subsequently, after receiving a collegiate education with a view to the ministry, applied himself for 4 years to legal, metaphysical, and historical studies. He then became pastor of a Methodist Episcopal church at Bangor, Me., and two years later president of a classical seminary at Providence, R. I., where he remained one year; and after residing for a year in Boston, he was called to the professorship of Greek and Hebrew in the Indiana Asbury university, where he remained 3 years. He has since been general editor of the books and magazine of the Methodist book concern at Cincinnati, and still later president of Genesee college. He has published "The Shoulder Knot, or Sketches of the Threefold Life of Man" (New York, 1850); "Hungary and Kossuth, or an American Exposition of the late Hungarian Revolution" (Boston, 1852); and "Methodism Successful, and the Internal Causes of its Success" (New York, 1859).

TEFLIS. See Tiflis.

TEGEA, an ancient and powerful city of Greece, situated in the S. E. part of Arcadia. Its territory was called Tegeatis. It is mentioned in the Iliad. Its early history was marked by a constant war between it and the Spartans, who for a long time unsuccessfully attempted to bring about its subjection. Charilaus, a Spartan king, invaded at one time the land of the Tegeans, but was defeated and made prisoner. Two centuries later Leon and Agesicles were unsuccessful in another invasion; but about 560 B. C. the city fell into the hands of the Spartans, and though retaining its independence was bound to furnish a military force when required. In the Persian war 500 Tegeans fought at Thermopylæ, and at Platæa 3,000. Subsequently they were again at war with Sparta, and were defeated; but during the entire Peloponnesian war they adhered constantly to the side of the Spartans, as they did also in the Corinthian war which followed. After the battle of Leuctra in 371, the Spartan party having been expelled, Tegea became a member of the Arcadian confederacy, and its citizens in 362 fought under Epaminondas at Mantinea. Subsequently it joined the Ætolian league, and in the wars between Sparta and the Achæan league was alternately in the hands of the contending parties. After the Roman conquest of Greece, it continued to be a place of considerable importance, but toward the close of the 4th century of the Christian era was taken and totally destroyed by Alaric.

TEGNÉR, Esaias, a Swedish poet, born at Kirkerud, Wermland, Nov. 13, 1782, died in Wexiö, Nov. 2, 1846. He was graduated at the university of Lund in 1803, and made professor of Greek literature there in 1812, having in the interval been an under professor. A patriotic poem entitled *Svea* (Sweden) was his first production, and obtained for the author the prize of the Swedish academy. In 1824 he was made bishop of Wexiö, and from that period devoted himself to his episcopal duties. The most admirable of Tegnér's poems is *Frithiofs Saga* ("The Legend of Frithiof"), which first appeared in 1825. It consists of 24 cantos, of different metres, each according to the style of the subject, and in imitation of the old Icelandic sagas. The most striking passages have been admirably set to music by Crusell, a Swede, and are constantly sung in family circles throughout the country. Among the works of Tegnér may be cited also the "First Communion;" "Axel," the story of a lifeguardsman of Charles XII.; the "Song of the Sun," a fine bacchanalian; the "Hero," a sketch of Napoleon; the "Sage," a didactic poem; and *Nattwardsbarnen* ("The Children of the Lord's Supper"). His writings were collected and edited by his son-in-law Prof. Bottiger (6 vols., Stockholm, 1848). The best translations of Tegnér's poems, according to his own opinion, are those of Longfellow.

TEHAMA, a N. co. of California, drained by the Sacramento river; area, about 1,000 sq. m.; pop. in 1860, 4,044. The surface is hilly, and the soil fertile and well adapted to grazing. The productions in 1858 were 133,450 bushels of wheat, 232,000 of barley, and 18,886 lbs. of wool. A large amount of timber is exported. There are two Indian reservations in the county, on which 8,000 Indians are settled. Capital, Red Bluffs.

TEHERAN, or Tehran, the capital of the kingdom of Persia, and of the province of Irak-Ajemi, 70 m. S. from the Caspian sea and 210 m. N. from Ispahan, in lat. 35° 41′ N., long. 51° 23′ E.; pop. in winter about 80,000. The town stands in a sandy plain, with mountains to the N. and E., and a fertile, well cultivated country to the W. It is of a square form, surrounded by thick walls about 4 m. in extent, and is entered by 4 gates ornamented with the figures of different kinds of animals. Inside there are many vacant spaces and gardens and extensive ruins; but the streets are narrow, irregular, unpaved, and exceedingly filthy. The houses are badly built and mean in appearance. The royal palace consists of a great number of buildings and gardens, and covers nearly ¼ of the area enclosed within the walls. It is fortified, and has a seraglio surrounded by lofty walls and guarded with great care. The bazaars are extensive, but are wretchedly kept and very dirty. There is a royal foundery, where guns of large caliber are made. One of the mosques is roofed with plates of gold. In summer the climate is unhealthy, and the monarch and about $\frac{7}{10}$ of the inhabitants leave the city and encamp on the plains of Sultanieh. On a hill in the neighborhood the king has a palace and beautiful gardens.—Under the Suffavean dynasty Teheran was not a place of importance. It was almost destroyed by the Afghans after the battle of Salman-abad; but it was afterward rebuilt, and has since received frequent additions to its fortifications. It was made the capital of Persia in the early part of the 18th century.

TEHUANTEPEC, a territory of Mexico, organized about 1850, and comprising the isthmus of the same name, bounded N. by the gulf of Campeachy, E. by the states of Tabasco and Chiapas, S. by the gulf of Tehuantepec, and W. by Vera Cruz and Oajaca; area, about 16,000 sq. m.; pop. in 1854, 82,395. Its width from gulf to gulf is 130 m. It is drained by the Coatzacoalcos river, which flows northward, discharging into the gulf of Campeachy, and extending about ¾ of the width of the territory; and by the Tehuantepec river, flowing into the gulf of the same name. There are several lakes and lagoons in the territory.

Capital, Minatitlan.—At one time it was proposed to construct a ship canal across the isthmus, improving the navigation of the Coatzacoalcos for a part of the distance, and using some small lakes as reservoirs at the height of land for the canal; but a subsequent project was the connection of the gulf and ocean by a railway which should form a part of the route from New Orleans to San Francisco, the isthmus being S. S. W. of New Orleans, and the route shorter by several hundred miles than any other proposed ocean route. Measures were taken to secure the grant of the route from the Mexican government, and it was provisionally opened by the despatch of vessels to the ports on either side, and the transportation of passengers by stage across the isthmus. The want of any good harbor on either side of the isthmus, and the immense expense which would be incurred in the erection of breakwaters adapted to produce even a partial shelter, as well as the shallowness of the harbors, have caused the project to be relinquished.—TEHUANTEPEC, a town of the above territory, is situated on Tehuantepec river, about 10 m. above its mouth, and 150 m. E. S. E. from Oajaca; pop. 14,000. It has salt works and cotton factories, and a considerable pearl fishery in which many of the inhabitants are engaged. Indigo is raised in the vicinity, and a purple dye is procured from a shell fish abundant there. The harbor is shallow and exposed to the hurricanes from the N. W.

TEIGNMOUTH, JOHN SHORE, baron, an English statesman, born in Devonshire, Oct. 8, 1751, died Feb. 14, 1834. He entered the civil service of the East India company as a cadet in 1769, and by successive promotions reached in 1786 the position of member of the supreme council under the governor-general, Lord Cornwallis, whom in 1793 he succeeded in office, and in 1794 he was made a baronet. The new settlement of landed property in the presidency of Bengal, and the new judicial system introduced under Lord Cornwallis, were mainly attributable to the efforts of Sir John Shore. He retired from office in the latter part of 1797, and was created Baron Teignmouth in the peerage of Ireland. Subsequently he was for many years a member of the board of control, and from 1804 until his death president of the British and foreign Bible society. He published in 1804 a memoir of Sir William Jones, whom he succeeded as president of the Asiatic society, and in 1807 he edited his works in 13 vols. 8vo. His "Life and Correspondence" was published by his son (2 vols., London, 1837).

TELEDU, or TELAGON, the name of the *mydaus meliceps* (F. Cuv.), a carnivorous animal of the family *mustelina*, emitting a fetid odor like that of the skunk, inhabiting Java, and confined exclusively to mountains 7,000 feet at least above the level of the sea. It is about the size of a polecat, being 15 inches long with a tail of half an inch, but the body is much thicker, the neck and limbs short and stout, and the feet plantigrade; the teeth are as in the skunk, the snout prolonged like that of a pig, the head badger-like, ears very small and concealed by the long hair, and the eyes very high in the head; the claws of the fore feet are long, compressed, nearly straight, and adapted for digging; the fetid secretion is poured out from 2 glands near the end of the rectum, opening about half an inch within the canal. It is a nocturnal animal, making a shallow burrow, and feeding on insects, larvæ, and worms. The color is blackish brown, with a narrow whitish stripe extending from the occiput to the tail. It is slow in its movements, trusting for safety to its fetid odor; the natives are fond of its flesh, which is almost always fat and tender; it sometimes does considerable mischief by destroying the roots of young plants in cultivated districts.

TELEGRAPH (Gr. τηλε, afar, and γραφω, to write), an apparatus by which intelligence is communicated to a distance. It properly includes the various methods of signalling, of which some account has been given in the article SIGNALS. The most obvious form of these, and one which has been adopted by different nations from remote antiquity, is that of fires made upon commanding points, which were visible at great distances, by their smoke by day and their light by night. By preconcerted arrangements, these are made to designate such intelligence as it may be desirable to communicate, such as the warning of the approach of an enemy, and to call the people together for their protection. The Roman generals, as described by Julius Africanus, perfected this method of communicating intelligence, so as to spell words by means of fires of different substances. The North American aborigines made use of regular stations over the western country for these signals; and the Indians of the north-west territory in this way communicated intelligence of the approach of Fremont, as he passed through their regions. Polybius describes two methods of telegraphing by means of torches; and Bishop Wilkins, after giving an account of this in his book entitled "Mercury, or the Secret and Swift Messenger," describes a method of conversing at a distance with 3 lights or torches at night, which may be so used as to indicate the 24 necessary letters of the alphabet, these being divided into 3 classes of 8 letters each, which are severally designated by one, two, or three torches, and the number of the letter by the number of times the torches are elevated or displayed. Another method was also proposed by Bishop Wilkins, in which intelligible signals were conveyed by means of two lights attached to long poles; and for long distances he suggested the use of the then newly invented telescope, or, as he called it, "Gallileus his perspective." A variety of systems of telegraphic signals were brought into notice by different inventors in the 17th and 18th centuries, one of the earliest of which was that of Dr. Robert Hooke described in the "Philosophical Transactions" for 1684. It consisted of 24 symbols formed of blocks of wood, representing alphabetic characters, and 6 more formed of curved lines to be used as arbitrary signals. These were to be exposed in succession in an elevated frame at some conspicuous point, and being observed at another station were to be there repeated and sent forward to the next, and so on. At night torches or other lights were to be substituted for the wooden figures. The first working telegraph of much importance was that known as Chappe's, which was brought into use during the wars of the French revolution. At the top of a tall post was attached a cross bar upon a pivot, so that it could be easily turned from a horizontal to an inclined position. Each end of this cross bar carried a short arm, which could also be turned upon its pivot so as to stand in any position in relation to the bar. The movements were made by means of ropes which passed through the bar and down the post. This apparatus admitted of 256 distinct signals; but M. Chappe limited its use in great part to 16 signals, each one of which represented a letter of the abbreviated alphabet he had constructed. The news of the recapture of Lille was conveyed in 1794 by this telegraph to Paris in an hour after the troops of the republic had entered the place. Mr. R. Lovell Edgeworth at about the same time brought before the public his plan of a telegraph, or as he called it telelograph or tellograph, by which the signals represented numbers, the meaning of which would be found in the dictionary prepared for this system. The signals were made by means of 4 pieces of wood, each one in the form of a long isosceles triangle, placed near together, each supported upon a pivot round which it could be turned in any direction. The movements of each were limited to 8 in number, and indicated the first 7 numerals and zero. The first triangle or pointer represented units, the 2d tens, the 3d hundreds, and the 4th thousands, so that any number might be expressed that did not contain the figure 8 or 9. The admiralty telegraph proposed by Lord G. Murray was used in England from 1795 to 1816, when it gave place to that known as the semaphore (Gr. *σημα*, a sign, and *φερω*, to carry), which the French had adopted in 1803. This consisted of 6 conspicuous boards or shutters set in a frame, each of which could be turned upon its axis so as to present either its edge or broad surface to the next station. The movements represented figures, and a series of numbers was indicated by their combinations. Some of these stood for the letters of the alphabet, and the others for arbitrary signals. The French semaphore (also known as signal posts) consisted of 3 or more arms attached by pivots to an upright post, admitting of motion in any direction, and indicating by their various positions either figures or letters. Many modifications of the apparatus were introduced into the English navy, as well as upon the land, by Sir Home Popham and Capt. C. W. Pasley, the most used of which, until the introduction of the electric telegraph, was that adopted by the admiralty in 1816. It was formed with two arms only, one at the top of a hollow hexagonal mast, and the other at some distance lower down. Each of these arms admitted of 6 different positions, easily distinguished from each other, and the two together could afford 48 signals, which are sufficient to express the letters of the alphabet and the Arabic numerals, and leave 13 for other signs. The mast was made to turn upon its foot, so as to display the signals in any direction. For holding telegraphic communication at sea, flags of various colors have long been used. (See Signals.) It has been proposed to employ a small helioscope or mirror for reflecting a ray of light from the sun as a means of communicating signals in clear weather. With a mirror so small that it may be carried in the waistcoat pocket, flashes of light may clearly be perceived for 12 miles or more, and the mirror being gently moved on some established system the appearance and disappearance of the flashes may indicate letters or words. Mr. Francis Galton, the African traveller, who proposed this at a meeting of the royal geographical society, described an optical arrangement he had devised by which the operator may know if the mirror is directed aright. Among the later publications upon the telegraphs adopted previous to the electric telegraph, are papers in the "Journal of the Society of Arts," vols. xxvi., xxxiv., xxxv., and xxxvi.; "A Treatise explanatory of a new System of Naval, Military, and Political Telegraphic Communications," &c., by John Macdonald (London, 1817); "Description of the Universal Telegraph for Day and Night Signals," by C. W. Pasley (London, 1823); and Edgeworth's "Essay on the Art of conveying Secret and Swift Intelligence," in the "Transactions of the Royal Irish Academy," vol. vi. —Electric Telegraph. It would seem that the idea of employing electricity for telegraphing should soon have followed the discovery, made about the year 1729, that the shock could be transmitted long distances through conducting media with great rapidity. But the attention of the early experimenters was chiefly directed to some of the more obvious phenomena developed by the newly invented Leyden jar, such as communicating the electric shock to a large number of persons in a continuous chain; the firing of alcohol by an electric charge sent through wires under water, as performed by Franklin across the Schuylkill river in 1748; the establishment of the identity of lightning and electricity, also determined by him at about the same time, &c. The electricity then known, which was produced only by friction, disappearing with each discharge, was not at all adapted for communicating signals, which requires a continuous current. The various discoveries which gradually led to the perfection of this system, together with occasional experiments relating to it, may be noticed in their chronological order. The discovery by Dr. Watson in 1747, that the earth itself and intervening bodies of water might be made use of to complete the electric circuit, was one important step toward this application. He transmitted shocks across the Thames and the New river, in one instance at Shooter's Hill the circuit being composed of 10,500 feet or about 2 m. of wire, and 2 m. of the earth; and he supported his wires, as now practised on the telegraph lines, upon posts. Signals were communicated by means of the electric shock from one apartment to another by Lesage at Geneva in 1774, and by Lomond in France in 1787, probably by causing the divergence of pith balls on some concerted plan; and in 1794 Reizen of Germany employed the electric spark for telegraphing, making use of an ingenious arrangement of lines and interrupted spaces upon strips of tin foil, so arranged that when these spaces were illuminated by the spark the form of the letter or figure was exhibited. He employed 37 wires from one station to another, each one of them communicating with one of the letters or figures, and each one connecting with a return wire, thus making 72 in all. This plan is described in vol. ix. of "Voigt's Magazine." Cavallo in his "Treatise on Electricity" (1795) suggests the explosion of gunpowder to call attention, and then the transmitting of signals by succession of sparks at intervals and in numbers according to the system agreed upon. Don Francisco Salva of Madrid and Sr. Betancourt constructed similar telegraphs at Madrid in 1797 and 1798, one of them extending between Madrid and Aranjuez, a distance of about 26 m. This, too, is noticed in vol. xi. of the work just referred to. Salva communicated his plans to the royal academy of sciences at Barcelona, and according to the journals of 1797 they were highly approved by the minister of state. Salva appears to have had a clear idea of the practicability of this electric communication even beneath the sea, and in the last of his memoirs he proposed to substitute the voltaic pile for the electrical machine. Other attempts to employ machine or friction electricity were made by Francis Ronalds at Hammersmith, England, in 1816, on a line of 8 m.; and in 1827 by Harrison G. Dyar at the race course on Long island, N. Y., on a line of 2 m. in length. The latter made use of iron wire, glass insulators, and wooden posts for supporting the wire, and employed the chemical action of the electric current to change the color of litmus paper as his method of communicating. Ronalds introduced the plan of employing a clock at each of the two stations, both of them running together exactly, and each bringing into view one after the other the letters of the alphabet arranged upon a disk which revolved behind a screen with an opening for one letter. Each clock was provided with two pith balls connected with the electrical machine at the other station; and as the shock was passed the divergence of these called the attention of the other operator to the letter then in view. As the letters appeared in succession they spelled out the message communicated. The clock movement is an important feature in most of the modern telegraph systems. The voltaic pile, discovered in 1800, furnished in its constant current a more promising agent for transmitting intelligence than the sudden and transient shock of the electrical machine; and electricians were not long in testing its capacity for this purpose. Sömmering commenced his experiments in 1809, and devised a plan of telegraphing which was as perfect as was practicable in the condition of the science at that time. He made use of 35 wires, each terminating in a gold point, and all the points were set up vertically on a horizontal line at the bottom of a glass reservoir of water. In the other direction these wires, brought together in a tube, extended to the other station, where they again diverged, each one terminating in a brass plate, and the plates attached along a horizontal wooden bar. The plates at one end and the points at the other were marked with corresponding letters, and the current from the battery was established whenever two of the brass plates were touched, one with the negative and one with the positive pole. Decomposition of the water immediately occurred in the reservoir on the two corresponding gold points, the one producing hydrogen and the other oxygen gas, and the letters thus designated were noted down as part of the message communicated. Sömmering found that the addition of 2,000 feet of wire produced little or no sensible additional resistance, and that the galvanic action was instantaneously developed at least for the distance of about 3,000 feet. The galvanic batteries then known were however inapplicable to the transmission of currents through great distances, both on account of not continuing long in action, and also for want of sufficient intensity without using an inconvenient number of pairs; and no further progress was made in perfecting the electric telegraph until the principles of electro-magnetism had been developed. (See ELECTRO-MAGNETISM.) The first discovery in this branch of science was that by Oersted of Copenhagen, in 1819, of the electric current as it passes through a wire causing a magnetic needle near by to place itself at right angles to the current, and that the direction of the movement may be changed by changing the connection of the wires with the two poles of the battery. Schweigger of Halle in 1820 discovered the method of increasing the deflection by placing the wire that carries the current around the needle, and this improvement is adopted in all the telegraphs of this character. The same year Ampère laid before the academy of sciences at Paris the plan of a telegraph based on the movement of magnetic needles thus induced. Each needle was to stand for a separate letter or figure, and consequently a great number was required. The early telegraphs of

Prof. Steinheil of Munich, and of Cooke and Wheatstone of England, constructed many years afterward, were based on this principle, and were finally perfected by reducing the number of wires. Ampère and Arago also discovered and put in practice the method of magnetizing needles by passing the electric current in successive coils nearly at right angles around them, which is still employed in making magnetic needles for compasses, &c. These discoveries, though preparing the way for the electric telegraph, were yet insufficient; and the opinion was even expressed in 1825 by Mr. Barlow, of the royal military academy of Woolwich, that in consequence of the diminishing power of the galvanic current with the increasing distance, estimating the power from his experiments as the square root of the length of the wire, the construction of the telegraph over long distances was impracticable. This checked further attempts for a time. The next discovery of importance was that of Mr. William Sturgeon of London in 1825. By coiling copper wire loosely around a piece of iron wire bent into horse-shoe form, with the turns of the copper wire quite separate from each other, and transmitting through this the galvanic current, he magnetized the iron, and thus produced the first electro-magnet of soft iron. This, however, was not applicable to telegraphic purposes, as from the open manner of coiling the naked wire to prevent the spires coming in contact, sufficient power could not be generated through a long conductor to develop the magnetic action necessary for closing the circuit, and thus producing a motion at will. Prof. Henry, in his experiments made in Albany, N. Y., in 1828–'30, first employed a covered wire, which could be wound in successive layers upon itself round the whole length of an iron bar, either straight or bent into a U; and he thus succeeded in so multiplying the magnetic force, that with the use of a small battery magnets were made of a power never before known, and the current was so increased in intensity, that the electric telegraph was at once made practicable for any distance. Upon all the telegraph lines except Bain's these electro-magnets are indispensable. The progress of discovery had now demonstrated the practicability of moving at will a magnetic needle in one or the other direction, or of causing the armature of a magnet to be attracted and then released, and of repeating and varying these movements rapidly for any number of times through wires extending any distance. The possibility of an electric telegraph based upon either one of these two movements was thus established, and was recognized by electricians; but to perfect it ingenuity of a high order was to be called into play, together with patient study and much perseverance. The first person to apply to this object the discoveries so far made was the baron Schilling of St. Petersburg. He devised in 1832 a telegraph on the principle of deflecting magnetic needles, each of which corresponded to a letter or figure, and was provided with its own wire of platinum insulated by being covered with silk, which wire surrounded the needle on the principle of Schweigger's multiplier. The several wires beyond the multipliers were brought together into one cord, and thence passed to the next station. It appears that he succeeded in reducing the number of needles, and finally employed but one. He also introduced an alarum at the commencement of the passage of the current by causing a solid body to fall, on the same principle as had been already recommended by Prof. Henry in his lectures. These promising experiments were unfortunately interrupted by his death, and the steps made were lost, without even a very accurate account being preserved of the results attained. The next experiments of importance were those of Counsellor Gauss and Prof. Weber of Göttingen in 1833 and 1834. They employed first galvanic electricity excited by numerous pairs, and afterward a magneto-electric machine to transmit signals from 9,000 to 15,000 feet. They caused a magnetic bar to be deflected to one side or the other, and interpreted its repeated movements into the letters of the alphabet; but no practical results followed their experiments. In 1836 the first form of the constant battery was invented by Prof. Daniell, supplying the means of keeping up a continuous current. This principle is universally adopted upon all telegraph lines, except those using the inductive current of Prof. Faraday's discovery, in the form of the magneto-electric machine. The first telegraph actually established appears to have been that invented by Prof. C. A. Steinheil of Munich in 1836, and adopted the next year by the Bavarian government. It extended a distance of 12 miles, employed but a single wire, and made use of the earth to complete the circuit. The signals were sounds produced upon a series of bells of different tones, which soon became intelligible to a cultivated ear; and the same movements that caused the sounds were also made to trace lines and dots upon a ribbon of paper moved at a uniform rate, on the same principle with the method devised about the same time by Prof. S. F. B. Morse. The generator employed by Steinheil was a magneto-electric machine on the inductive principle discovered by Faraday, but with the magnets stationary and the multiplying coils revolving close to them. A current of more uniform flow was thus obtained than could be had with the voltaic pile.—In 1837 several telegraphs were brought before the public in different countries, the production of independent inventors. That of Prof. Morse of the United States, which has continued to be generally recognized in all parts of the world as the most efficient and simple, was first publicly exhibited in the university of New York in 1837, and had been gradually brought to a working condition by experiments and contrivances devised by the inventor since 1832, with the assistance of Prof. L. D. Gale and Messrs. George and Alfred Vail. In Oct. 1837, Prof. Morse filed a caveat in the patent office to secure his invention; and he obtained the patent in 1840, covering the improvements he had in the mean time made in the apparatus. The telegraph was first brought into practical use, May 27, 1844, between Washington and Baltimore. An insulated wire was first tried buried in a lead pipe underground, and failing was replaced with one on posts. The power was derived from a galvanic battery, and an iron electro-magnet was employed at the receiving station for developing its effects. With the armature of the magnet was connected first a pen with ink or a pencil for producing lines and dots upon a moving slip of paper, as the armature was drawn down to the two poles of the magnet on each closing of the circuit at the other station; the continued action of the battery causing a line to be drawn as the paper moved along, and the immediate breaking of the circuit after closing admitting of merely a dot. The combination of dots and lines to represent letters and figures, and the simplicity and efficiency of the apparatus for producing these, are the features which distinguish this from other telegraphs, which employ the armature movement instead of the deflection of the needle, and have led to the preference generally accorded to it throughout the world; and Mr. Morse is entitled to great credit for conceiving this plan with the use of only one wire so early as 1832, and steadily adhering to it until he had brought it to perfection. The apparatus was improved by the substitution of a sharp point for the pen or pencil, which is attached to one end of a lever, at the other end of which is the movable armature. The circuit is closed by the operator who is sending a message pressing with his finger upon a single lever connected at its fulcrum with one of the wires of the battery, thus bringing it in contact with the other pole, and the connection is instantly broken for a dot, or allowed to continue a perceptible period of time for a line. The paper of the registering apparatus is moved regularly along by clockwork. The signs for the letters in use for the English alphabet (which are variously modified to adapt them to other alphabets), and for the numerals and punctuation marks, are as follows, those most used, as will be noticed, being the simplest:

LETTERS.

A ·—	G ——·	M ——	S ···	Y ·· ··
B —···	H ····	N —·	T —	Z ··· ·
C ·· ·	I ··	O · ·	U ··—	& · ···
D —··	J —·—·	P ·····	V ···—	
E ·	K —·—	Q ··—·	W ·——	
F ·—·	L ——	R · ··	X ·—··	

NUMERALS.

1 ·——·	3 ···—·	5 ———	7 ——··	9 —··—
2 ··—··	4 ····—	6 ······	8 —····	0 ——

PUNCTUATION.

Period	··——··	Exclamation	———·
Comma	·—·—	Quotation	·—·— ·—·—
Interrogation	—··—·	Parenthesis	—···—

The slightness of the difference, which cannot be avoided, between some of the signs, as in the C and S, I and O, L and T, &c., exposes to mistakes, which in case of writing in cipher cannot be corrected, and not always when the message is perfectly understood by the operator who sends it. Thus a merchant telegraphed from New Orleans to his correspondent in New York, to protect a certain bill of exchange; the word "protect" was read as "protest," and involved serious consequences to the parties interested. In the offices in the United States, where the Morse telegraph is employed, the recording instrument is now generally abandoned except at local and interior stations, and the operator trusts entirely to the sound caused by the opening and breaking of the circuit. This saves the expense of an extra assistant for reading the despatch to the copyist, the operator now writing down the messages as he receives them by the ear. Experience has proved that a much smaller number of errors are made in receiving by sound than by the former method of reading from the strip of paper.—What is known as the English telegraph is the result of the investigations and inventions of Mr. William F. Cooke, whose attention was directed to this subject in March, 1836, when a student at Heidelberg, by witnessing an experiment performed by Prof. Möncke of causing the deflection of a magnetic needle by the electric current. Though unacquainted with the subject, he immediately set himself to work to apply the principle to the telegraph, and in July of that year he produced an experimental instrument, which he not long afterward took to England and sought to introduce on the Liverpool and Manchester railway. He there became associated with Prof. Wheatstone, and the two united their labors to perfect the instrument. The first patent for an electric telegraph was issued to them on June 12, 1837. They employed 5 magnetic needles and coils, and either 5 or 6 wires, with a peculiar key-board previously invented by Prof. Wheatstone, upon which were arranged the letters, and these were designated in turn as any two of the needles arranged across the centre of the board pointed to one and another of them. The apparatus underwent various modifications in the hands of its inventors, and was much simplified by the use of only two needles, and finally of only one, which may be but a wooden pointer. This is arranged upon the middle of a vertical tablet through which the axis it turns on passes to the electro-magnet that is secured on the back of the tablet, and within which is the real needle that causes the movement. Letters are designated by the deflection of the needle to the right or to the left one or more times in either or both directions for each letter. The swinging of the needles is checked by small pins fixed on the dial, so that their motions are rendered precise and clear.

The magnetic coil has its own pair of wires, one end running into the ground and the other extending to the other stations, and with these wires are also connected the batteries, by which communications are sent. In case of accident to the wire of one instrument, that of the other serves to keep up the communication. Handles placed in front under the dial furnish the means by which the attendant can immediately connect the poles of the battery with the wires in either way, so as to cause the needle to move to the right or to the left, and by partially turning them instantly reverse the poles and consequently the direction of the movement of the needle; or he can by the same apparatus interrupt the connection of his battery with the wires, in order to receive communications. With each apparatus was formerly connected an alarum bell, the clapper of which was moved by a weight or spring connected with clockwork, on this being set in action by the electric current attracting the armature of an electro-magnet, and thus moving a lever that held the apparatus in check. This is now generally abandoned, the sound made by the click of the needle against the ivory studs that prevent its vibration being found sufficient. Prof. Wheatstone introduced one very important feature in the electric telegraph, which is a second battery for working the alarum, and which has since been applied to other purposes also requiring more power than that furnished by the first battery. It is brought into action by the deflection of a magnetic needle, the ends of which are thus placed in contact with the two wires of the second battery, and so close its circuit. When the current of the first circuit is interrupted, the needle swings back, breaking the circuit of the second battery and throwing it out of action. This is the principle of the relays employed to renew the power upon telegraph lines of great length. The telegraphs which are used upon the railways of Great Britain and by the "Electric Telegraph Company" are generally double, each employing its own wires. One of the needles then indicates by its movements the letters of one portion of the alphabet, and the other the remaining letters. Two handles in the lower part of the dial, one under each needle, serve for sending the messages. The needles upon the dial are moved by the messages sent as well as by those received, so that each operator may see the signals he makes. It thus appears that by the English telegraph no record is made by the apparatus itself of the message; the operator observes the signs, and notes them upon paper as they succeed each other. It is thence sometimes distinguished as the indicator telegraph, while the others are called registering telegraphs. Morse's telegraph may be one or the other, as it is used to prick the signals upon paper, or as the operator interprets them by their sound. With the English double-needle telegraph, employing two wires and two batteries and other apparatus at each station, an expert operator can send as many as 150 letters a minute; but this is more than can be correctly read, the limit of which is about 100 letters a minute, and in actual practice the number is somewhat less than this, or from 17 to 24 words a minute. Operators accustomed to the work do not require the lettered dial for reading the movements of the needle.—Of the numerous telegraphic inventions that soon succeeded those already named, Mr. Alexander Bain's are particularly worthy of notice. He was engaged in England as early as 1840 in the production of a printing telegraph, and in 1846 patented what is known as an electro-chemical telegraph, the principle of which was first applied to this purpose by Harrison Gray Dyar in 1827, and by Mr. Edward Davy in England in 1838. Mr. Bain brought his new telegraph to the United States in 1849, and, after overcoming the opposition made against it on the ground of its infringing the Morse patent, it was brought into active operation upon several of the most important lines in the country, and was the means of reducing the cost of telegraphing 40 per cent. The two interests were afterward consolidated, and the Morse patent was adopted upon all the lines excepting that from Boston to Montreal. The Bain telegraph is remarkable for its extreme simplicity. No electro-magnet is required, the galvanic current passing through the wire from a distant station being sufficient to produce a distinct mark upon the chemically prepared paper interposed between the point or index at the break in the circuit and the extension of the wire into the ground. As this involves no change in the direction of the current, the same pole always remains connected with the earth, and the other (which must be the positive pole in order to produce a colored mark upon the paper) is brought into connection with the line by closing the circuit with the key. The paper is brushed over with a solution of 6 parts of prussiate of potash in water, to which are added 2 parts of nitric acid and 2 of ammonia. Thus prepared, and while damp, it is made to pass over a metallic roller; a fine needle or style presses gently upon the surface; a simple machine moved by clockwork to carry the strip of paper is all that is required. The branch or local circuit of Morse can be applied as well to this system for drop copies, or resistance coils can be used to effect the same object, producing with each closing of the circuit a line or a dot, on the principle of the Morse and other similar systems. As it makes its marks instantaneously, however, without the intervening movement of an armature, it may be made to communicate messages with much greater rapidity than the Morse telegraph. It is observed of this system that it is not in danger of disturbance during heavy thunder storms, which occasionally do serious injury to the operators as well as to the apparatus employing the electro-magnet; and sufficient electric force to accomplish its work may be transmitted through the wire for long distances (as has occurred between New York and Boston), with the wire actually lying upon the ground during a heavy rain storm. So little power is required to work it under ordinary circumstances, that 10 cups of the Grove battery have been found sufficient between Boston and New York. This telegraph, like most of the others excepting the Morse, requires an alarum bell to call the attention of the operator when a message is to be sent from another station, and for this an electro-magnet is employed distinct from the registering apparatus. Mr. Bain made many other inventions in the telegraph, several of which are too remarkable to be passed over. One of these, adapted for transmitting words at the extraordinary rate of 5,000 per hour, employed at the sending station narrow strips of paper perforated with holes and elongated slits, making the message in these regular characters of the system. These strips (prepared beforehand) were passed in succession over a cylinder of metal with a pin connected with the wire so placed as to press lightly upon the paper and enter each hole as it passed along and complete through it the circuit. At the other station similar strips of chemically prepared paper were passed at precisely the same rate under the same sort of style as that just described, and colored marks were thus produced exactly corresponding to the holes in the paper at the transmitting station. The advantage of this system is in the transmission of very long messages which may be prepared in separate parts by a number of operators; or, as is now done, by the use of a very ingenious machine which perforates the paper with great rapidity, as it is worked by striking keys like those of a piano. The difficulty in the practical application of this telegraph appears to be the want of some efficient means of exactly regulating the speed of the apparatus. The universal telegraph of Prof. Wheatstone, recently introduced in London, is based on this principle. Another of his inventions was a printing telegraph, in which types arranged around the periphery of a wheel were brought successively opposite the face of a cylinder covered with paper and instantly pressed against it, while the cylinder turned at a regulated speed around its axis, and at the same time was carried longitudinally along it so that the printed lines passed in spirals from one end of the cylinder to the other. The electric current caused the rotation of the wheel having the types, and also stopped or liberated the other movements which depended upon springs and clockwork. The machines at the different stations are precisely alike, and all their movements are perfectly synchronous. A printing telegraph of somewhat similar construction was invented in 1837 by Mr. Alfred Vail of New York; and others have been produced by M. Froment in France, Royal E. House of Vermont, David E. Hughes of Kentucky, and Jacob Brett in Great Britain. Some of these will be noticed further on.—An electric copying telegraph was invented by Mr. F. C. Bakewell of England in 1850, designed for giving an exact copy of the message sent. This is written with a pen dipped in varnish upon a sheet of tin foil, which is then laid around a metallic cylinder, corresponding precisely in its size, rate of revolution, and longitudinal movement, with another cylinder at the receiving station, which is covered with chemically prepared paper and provided with an index like that of the Bain chemical telegraph. These cylinders being set in motion at the same instant, the index of the registering apparatus makes a continuous colored line, running round the cylinder in a close spiral so long as the metal style at the other station presses upon the tin foil; but as this passes over the lines of varnish a break in the circuit occurs, causing an interruption of the colored line at the other station. The blank spaces thus produced will be found when the lines have been drawn over the whole paper to be a facsimile of those written in varnish upon the tin foil. The lines, though drawn as spirals upon a cylinder, appear as parallels when the paper is taken off. About 10 revolutions of the cylinder, making as many parallel lines, are sufficient to complete one line of writing; a cylinder 6 inches in diameter affords sufficient length for about 100 letters of the alphabet in one line; and as the rate of revolution is not less than 80 in a minute, 800 letters or more may be transmitted in this period. A message in cipher can be sent by this method without risk of error, and even invisible messages written in colorless varnish may be received and impressed in invisible characters upon prepared paper, to be afterward brought out by chemical means; thus, if the paper be moistened with diluted acid alone, no visible mark is left upon it until it is brushed over with a solution of prussiate of potash, when the lines appear in their blue color.—The patent for the House printing telegraph was issued by the U. S. patent office in 1848, but bears date April 18, 1846, when it was first applied for. It was with this apparatus that the first printed despatch ever produced upon a telegraph line was sent, in the autumn of 1847, from Cincinnati to Jeffersonville, opposite Louisville, Ky., 150 m. The system is regarded as one of the most wonderful and complete of the extraordinary inventions developed by the telegraph. The necessity of avoiding the peculiar features upon which other telegraphic systems were established, in order to give to it a distinctive and patentable character, added greatly to the difficulties of the undertaking, which however were after nearly 6 years of labor overcome by the ingenuity and perseverance of Mr. House. The apparatus is too complicated for any description of it to be made intelligible without illustrations, and little more can be attempted than to state its great powers of execution and its perfect accuracy. The mechanical movements of this machine are set in action by hand labor applied to a crank, which works an air pump for the purpose of supplying a current of condensed air, which under the control of the electric current carries forward the movements of the composing and printing apparatus, so that each letter may be printed at the exact instant that it is struck upon the key-board of the instrumeut. This key-board, which resembles that of a piano, is connected with the electric current, and as the keys are struck the circuit is opened and closed with the movements of a circuit wheel which controls the movements of the type wheel. A complete revolution of the circuit wheel, coming round again to the same letter, breaks and closes the circuit 28 times, and other letters a less number according to their arrangement on the type wheel. The printing apparatus is quite distinct from the circuit, but the composing apparatus forms a part of it. The impression of the letter is produced by a blackened ribbon being pressed against the paper by the type. From the galvanic battery of one station, the current passes along the wire to the next station, then through the coil of an axial magnet to the insulated iron frame of the composing machine, and thence to a circuit wheel revolving in this frame. Through a spring that rubs on the edge of this wheel it passes into the return wire, and through another battery back to the first station to pursue the same course through the composing machine and magnet there and all others upon the line. In sending a message, the operator sets his machine in motion and gives a signal by breaks of the circuit, repeated a different number of times for different offices on the same wire. As this is heard by the operator at the receiving station, he sets his machine in motion, and the type wheel at its starting point, and signals back that he is ready. No further attention is required on his part, while the machine goes on, printing in Roman capitals the communication upon the long strip of paper regularly supplied to the type wheel. Two hundred and fifty to 260 letters as a maximum can be accurately printed every minute, and over 8,000 words an hour of press news, partly abbreviated, have been sent over the wires with a single instrument.—The inventions of Mr. Hughes, patented May 20, 1856, showed that the field of discovery in telegraphing was far from being exhausted, by introducing apparatus even more wonderful in its operation than any which had yet preceded it. His was a printing telegraph, in which the feat of printing a letter with every impulse or wave of the electric current was accomplished. In the other telegraphs, as already described, several impulses produced by successive closings or breaks of the circuit are required to form a single letter; this in House's telegraph varies up to 14 breaks, the maximum required for repeating the same letter, and averages about 7 impulses; and in the Morse system the average is about 3½ impulses, some of which making lines are of longer duration than those making merely dots. The saving of time thus effected is of great importance, especially on long lines in which an appreciable amount of time is expended in the passage of the current. In long lines of submarine telegraphs, as will be noticed below, a greatly increased resistance is experienced in charging the wires with the electric current, and the impulses necessarily succeed each other with extreme slowness and diminution of force. The type wheel in the Hughes system is provided with 28 types; it is kept in rapid revolution during the whole time of operating, and is so perfect in its movement, that though the revolutions may be from 100 to 140 per minute, the variations of two machines at different stations do not exceed $\frac{1}{20}$ of a second in several hours' running. At the instant one of the 28 keys of the key-board, which is like that of the House telegraph, is depressed, the current entering the magnet at the distant station causes the strip of paper to be brought against the type opposite to it at the time, and receive the impression in ink while this is rapidly carried round with the wheel. The operator can send an average of two impulses with each revolution of the type wheel, thus making the capacity of the instrument full 200 letters or 40 words per minute, and the maximum is much above this. The regulators or governors of the clockwork which carries the type wheels at the different stations are of an entirely novel character. These are springs of the same musical tone, which consequently vibrate the same number of times per second, and which control by their vibrations the escapement of the apparatus. The power of the electric current required is reduced in a wonderful degree by the combination of the natural magnet and the electro-magnet, making only so much electricity necessary as will neutralize the magnetism in the natural magnet by causing magnetism of an opposite polarity to be created in the poles of the electro-magnet. This extreme delicacy, however, renders the telegraph liable to be interrupted by atmospheric electricity, such as is developed previous to and during the continuance of the aurora borealis. It is asserted that this instrument can work upon a longer line without the aid of repeaters than any other, and this with an extraordinarily low battery power.—In the winter of 1858 a new instrument was perfected by G. M. Phelps of Troy, combining the most valuable portions of both the House and Hughes patents, and which has been introduced with great success on nearly all the lines formerly using those inventions. This has appropriately been termed the "combination" instrument, and has the advantage of being able to work through a much longer circuit than the House machine, with a smaller battery, as well as of being much simpler in construction. The key-board and transmitting machinery of this instrument are precisely like those of Hughes, as is also the printing apparatus, with the exception of the electro-magnet, which is of the ordinary form, and operates upon the type wheel through the medium of compressed air as in the House machine. The vibrating spring used by Hughes as a governor is superseded in the combination instrument by a most ingenious electro-magnetic governor, the invention of Mr. Phelps. It consists of a hollow iron drum, geared to the transmitting cylinder and type wheel of the instrument and moving with them, but much faster. If the machinery has a tendency to revolve too rapidly, the increased centrifugal force, acting upon a detached section of the drum, actuates a series of levers inside, by which a spring is raised, closing the circuit of a local battery through an electro-magnet. A friction brake, which is applied to the revolving drum by the attraction of this magnet, instantly reduces the speed to the required limits, when the local circuit is again broken. The combination is considered to be the most perfect printing instrument yet produced.—Among the several telegraphs employed in England, those of the "Magnetic Telegraph Company" are worked by magneto-electricity, thus dispensing with voltaic batteries, the use of which involves much care and expense. The apparatus is remarkably compact, without clockwork or complicated movements such as are common in other telegraphs. Though used double with two sets of magnets, with a wire from each connecting with two needles upon the dial at the opposite station, the whole apparatus including the tablet or dial occupies but a few inches space, and is always ready for instant use, however long it may have remained inactive. The magnets, of horse-shoe form, about 12 in number for each set, are about 15 inches long and 1½ broad. They are laid one upon another in two piles near together, and fastened down to the table by screws. Opposite the ends of each pile, placed upon a rotating axis, is the soft iron armature, consisting of two cylinders wound around with long coils of fine copper wire covered with cotton. The wire of the two coils is connected together, and one end of each passes in a spiral through the axle to the platform upon which the apparatus rests. One end is thence carried into the earth, and the other goes to the electro-magnet of its own dial, thence to the distant station, and through the instrument there into the earth. The same arrangement is repeated with the other set. The axis of each armature extends toward the operator, and is provided with a crank handle by which each is turned to generate the electric current. The effect is seen in the movement of the two needles placed upon the dial over the magnets. It is asserted that this telegraph is worked with the greatest economy, that it cannot be disturbed by electric storms in the atmosphere, and that its average celerity has been found to be 27⅓ words per minute, with a maximum of 37⅛.—Telegraph wires are carried over the surface of the country supported upon poles standing 25 to 30 feet above the ground, and placed from 80 to 100 yards apart. If made of red cedar or locust and about 10 inches diameter at the base, they may in general be depended upon for 30 or 40 years; but some poles decay in 3 or 4 years. The durability of other woods may be increased by thoroughly coating them with coal tar. In Europe it is common to saturate the wood with some of the chemical preparations noticed in PRESERVATION OF WOOD. In crossing rivers, where, on account of the swiftness of the current or the danger of disturbance from drift wood, ice, or the anchors of vessels, an insulated wire could not safely rest upon the bottom, masts are erected on the opposite shores, sufficiently high for the wire suspended between them to be above the reach of the masts of boats and vessels that navigate the stream. The longest span in Europe is one of 1,700 feet over the Niemen river at Kovno, in Lithuania. In the United States there are many much longer crossings. That formerly used over the Hudson river at Fort Lee was of 2,700 feet; but the river is now crossed from the foot of 14th street to Hoboken by 6 sunken cables, each having 3 conductors. The Mississippi is crossed at St. Louis in two spans, one of 2,700 and one of 2,200 feet; and near Cape Girardeau, 2,980 feet, from a mast on the Illinois shore 210 feet high to one on the Missouri shore 205 feet high, from a base 110 feet above the water. The Ohio at Paducah is crossed in two spans, one of 2,400 and one of 3,720 feet. At the last named point, on the Kentucky side, the mast is 307 feet high above a bank 32 feet from the water; on the island in the river is a mast 205 feet high, and on the Illinois shore is one 215 feet high. Such masts require strong bracing to bear the strain of the wire with so long a leverage, and resist the action of the winds. The wire employed in these crossings is of iron known as No. 16, and weighs about 68 lbs. to the mile. Sunken cables are fast taking the place of all such river crossings. The ordinary telegraph poles require to be of sufficient strength to sustain a weight of over 400 lbs. suspended upon the wire between them, and at corners they should be still stronger. The following table represents the common numbers of iron wire used for this purpose and its strength, as plain wire, and also when coated with zinc, the figures representing in pounds the strain at which each kind broke. The American wire is stronger than the English, and about equal in this respect to the Swedish:

No.	Plain iron.	Zinc-coated.	No.	Plain iron.	Zinc-coated.
6	2,390	2,300	10	1,385	1,270
7	2,210	2,010	11	1,155	1,043
8	1,985	1,820	12	992	832
9	1,665	1,520	13	886	641

As, with batteries of the same intensity, the power of conducting currents of electricity increases with the superficial area of the conductor, large wires are to be preferred to smaller ones upon long circuits. In working direct, a distance of over 400 or 500 miles, the line is usually divided at some intermediate point into two distinct circuits, which are connected by means of a "repeater." This operates as a double relay, so that if the circuit be broken on either side of the repeater, it will break the circuit on the other side also. The combined circuits can thus be operated from either end as if they were one continuous wire, while the current of each battery has to pass only half the distance between the terminal stations. A line can thus be extended indefinitely by interposing repeaters at proper intervals and dividing it into a number of separate circuits. Copper wire is a much better conductor than one of iron of the same size, and would carry the electric current from 5 to 6 times as far; but want of strength, and frequent breakage from its greater expansion and contraction by the changes of temperature, prevent its use except on important submarine lines.—Upon some telegraph lines in Europe and in Asia, the wires, instead of being supported upon poles, are buried beneath the ground. Their first cost is always heavy, and many of them have soon proved failures through imperfection in the insulation of the wires, and sometimes from settling in the ground. The wires are best insulated by coating them with gutta percha, and they are protected from injury by laying them in pipes of lead or of earthenware, or in wooden boxes preserved by saturating the wood with a solution of sulphate of copper or chloride of zinc. Some of these lines have worked perfectly well for many years, but when they fail it is a matter of great expense and difficulty to discover their defective points. The insulation of the wires upon the posts is a matter of much importance, and is not easily effected, for any non-conducting substance interposed between the wire and the post becomes a conductor when its surface is wet with rain. Glass knobs with grooves around them for securing the wire have been made of a great variety of forms, and secured to the posts, or to the cross bars where these are to carry several wires, by pins of wood or iron. A great improvement upon this is a glass cap exactly fitting over a wooden pin 1¼ inches in diameter, and having an outer covering of wood, saturated like the pin with coal tar and pitch, to which the wire is fastened, and which, projecting below and entirely covering the glass, keeps it dry and makes the insulation complete. Hard rubber insulators have been very extensively applied in the northern states during the past five years. The devices in use in different countries for this purpose are very numerous. In forests the wires should be allowed to pass loosely through the supports, so that in case of a tree falling upon them they need not be broken; but in an open country they are usually fastened to each post. The wires are tightly strained as they are set and secured to the posts; and after the work is completed they require to be frequently looked after by attendants designated repairers, who follow the line and connect the wires when broken by drawing the ends together and soldering them. These men are often expert operators, and it is narrated of some of those employed in the United States, and familiar with the Morse system, that they can receive intelligible communications through the impressions made by the electric current upon the tongue when the two wires are placed one above and one beneath it.—In the extent of its telegraphic lines the United States has exceeded every other country. In 1860 it was estimated that there were over 50,000 m. in operation; and since that time the number has been largely increased by the completion of the line from St. Louis to San Francisco, which was opened Oct. 25, 1861, and thence to Oregon. In New York city a great number of lines are concentrated, and the following will convey some idea of the extent of the business carried on by the associated companies in their building situated at the corner of Broadway and Liberty street. The basement contains the "delivery" department and the supply department or storeroom, where all materials and instruments used on the lines are kept on hand to be used as required. On the first floor is the department for the reception of messages, in the rear of which is the operating room of the American company, a spacious apartment containing 25 instruments, each arranged on its own table. The wires enter at the rear of the room, and pass to a "switch," which is so arranged that any instrument in the room may at pleasure be instantly placed in connection with any line entering the office. From the switch wires are conducted separately to each instrument. On the second floor are rooms occupied by the president, secretary, and other principal officers of the company. The third floor contains the operating room of the New York and Buffalo and Erie lines. The rooms of the associated press are on the fourth, and the battery room on the fifth floor. In the latter room are some 875 cells of Grove's battery, from which all the lines are supplied with their electric current. —It is estimated that in Great Britain and Ireland there are 40,000 m. of telegraph; in Germany, 35,000; in France, 26,000; in Russia, 12,000; in Italy, 6,600; in Switzerland, 2,000; in Denmark and Sweden, 2,000; in Turkey and Greece, 500. In Australia it is believed there are about 1,000 m. completed, and in India over 5,000 m. controlled by the East India company. The Russians are engaged in extending a very important line from Moscow to the Pacific, which will thus connect eastern Asia with the countries of Europe, and eventually by Behring's straits with the American continent. This line was completed to Perm on the borders of Siberia, and thence over the Ural mountains to Omsk on the Irtish, in 1861; thence it is to be continued to Tomsk, and S. E. to Irkootsk, the capital of Eastern Siberia. It will then cross the Altai mountains to Kiakhta on the Chinese frontier, and then to Cheta on the Amoor. It will then cross to Nertchinsk, to which point it is to be completed in 1868. From Oroum or some other point on the Amoor one branch will extend down the river, and another toward the S. to a Russian port on the Japan sea. The route from the mouth of the Amoor toward the American continent may be by a short submarine cable to the island of Saghalien and the whole length of the island to its southern extremity, and by a submarine cable to the island of Yesso, and thence by a succession of cables and short land lines through the Koorile islands to the S. point of Kamtchatka; thence along the E. coast by Petropavlovsk to a point opposite Behring's island. By another series of cables and land lines the telegraph will then be extended by the Aleutian islands to America. These islands are inhabited, and the line through them is doubtless much more practicable than by Behring's straits. The longest cable required will not, it is supposed, exceed 200 m. From Russian America to Oregon the intervening space is about 1,700 m., and on the Asiatic side from the straits to the mouth of the Amoor the distance is about 2,200 m. It is believed that the cost of making this connection, unless more serious difficulties are encountered with the savage tribes than is apprehended, will not exceed the cost of the Atlantic cable which was laid in 1858.—The applications of the telegraph have been extended to purposes never anticipated by those who have been most instrumental in establishing it. In 1852 Dr. William F. Channing and Moses G. Farmer of Boston devised a system of telegraphic fire alarms, which was adopted in the city of Boston. Five so called signal circuits were extended from the city hall to different parts of the city, and in connection with these were stationed 50 signal boxes attached to buildings at convenient points. The door of each box being opened, a crank is seen with directions for the number of times it is to be turned to convey to the central office the number of the station and district. From the central station 5 wires called alarm circuits connect with the different fire bells throughout the city, the hammers of which, run by weights, are set in action by the telegraph itself and strike the number of the district and station of the alarm. The electric current is excited by a magneto-electric machine which is set in motion by the pressure of the water with which the city is supplied, and the same power is employed to wind up the weights that move the bell hammers. The bells have been rung as an experiment from Portland through the telegraph wires extending to that place, and arrangements had been made just as the Atlantic cable ceased to work to have them set in operation from the telegraphic station in London. The fire alarm also affords an incidental protection to the city from lightning. Large metallic surfaces being placed near the wires at all the stations and connected with the ground, a stroke of lightning upon the wires will leap across to these conductors, and pass harmlessly to the ground, while the artificial current possesses too little intensity ever to overcome the intervening space, and continues in the circuit. Similar arrangements are provided upon many telegraph lines. The fire alarm telegraph is also employed to designate the exact noon by a single stroke upon the bell of the Old South church, an exact chronometer being placed in the circuit and arranged so as to pass the current at 12 o'clock precisely. By a similar arrangement in London a large ball is made to drop exactly at 12 o'clock from a pole erected in the Strand by the action of a current from the royal observatory. The same thing is also done at Nelson's monument, Edinburgh. In Paris a cannon is fired upon a similar plan. Chronometers in observatories are also made to run synchronously with a standard instrument by means of the electric current connecting them with this.—The application of the telegraph to the determination of longitude has been described in the article Coast Survey, vol. v. p. 397.—Upon some railroads, as the Erie road especially, the telegraph is used with great advantage for regulating the running of trains from the different stations, and it is found that a single track by its aid may safely work up to the usual capacity of two tracks.—In numerous places telegraphs have been constructed for private purposes, as from the workshops to the offices of manufacturing establishments; and for government purposes from the halls of legislation to the printing offices, thus affording the greatest facilities for the immediate printing of important public documents, and of speeches while these are in course of delivery. A system of telegraphs for the use of large cities has been recently devised by Prof. Wheatstone, by which a company will lease the use of a small wire by the year to individuals. For distances not exceeding 20 m. a copper wire no larger than a cotton thread is sufficient. Numbers of these, insulated by being wound with thread, it is proposed to bring together into one cord, and suspend as many of these as may be required from strong iron wires passed in different directions through a city upon the houses. The latter, communicating with the ground at numerous points, will convey away all atmospheric discharges that might otherwise be troublesome.—The idea of a submarine telegraph appears to have been conceived by several of the earlier electricians. Don Francisco Salva is said to have proposed one as early as 1797 between Barcelona and Palma in the island of Majorca. Experiments were made in India by Dr. O'Shaughnessy in 1839 with this object, and he insulated his wires by covering them with tarred yarn, enclosing them in split rattan, and covering this again with tarred yarn. Prof. Wheatstone in 1840 gave it as his opinion before a committee of the house of commons that a submarine communication between England and France was practicable. Prof. Morse, on Oct. 18, 1842, laid a copper wire, insulated by means of a hempen strand coated with tar, pitch, and India rubber, from Governor's island to the Battery in New York, and the next morning was beginning to receive communications through it, when the wire was caught in the anchor of a vessel getting under weigh, and being hauled on board was robbed of a considerable portion which the sailors carried away. It was to avoid the risk of disturbance that Prof. Morse entered upon those investigations which led to his discovery of a method of transmitting the current across a body of water by means of extending the wires a distance proportionate to the width along the banks on each side, and causing the poles to terminate each pair opposite each other in large metallic plates in. the water. Mr. Samuel Colt laid a submarine cable in 1848 from Coney island and Fire island, at the mouth of New York harbor, up to the city, and operated it successfully. (See Colt, Samuel.) The first submarine telegraph wire laid in Europe was across the Rhine from Deutz to Cologne, a distance of only about half a mile; it was insulated with gutta percha, and laid by Lieut. Siemens of the royal Prussian artillery. This appears to have been the first application of gutta percha to this purpose, the substance about that time first beginning to attract attention. The grand attempts to connect the European with the American continent by laying a cable across the Atlantic, commenced in 1857 and perfected Aug. 5, 1858, have been noticed in the article Field, Cyrus W. Before these were undertaken great encouragement was given to the enterprise by the successful experiments made on Oct. 9, 1856, in transmitting distinct signals at the rate of 210, 241, and even 270 per minute through a number of connected coils of wires insulated with gutta percha, and making a total length of about 2,000 m., increased to a virtual circuit of 2,300 m. by the interposition of fine wires at the joinings of the coils. The wires were excited through the magneto-electric coils of Mr. Whitehouse, and the signals were received upon the ordinary recording apparatus of Prof. Morse. But a great difference was afterward experienced in the working of the wires when submerged. Before the laying of the cable it was ascertained that insulated wires acquire a new character when submerged, and instead of transmitting the current as simple conductors, they are of the nature of the Leyden jar, the gutta percha corresponding to the glass, the inner wire to the interior coating, and the iron coating or the fluid surrounding the cable to the exterior conducting surface, and that consequently the cable must be charged throughout the entire length before any effect is produced. Among other interesting phenomena, it was observed that the voltaic current is not transmitted so rapidly through such a conductor as the magneto-electric current; that several distinct impulses may pass in succession at the same time, one after the other, through the wire within certain limits without interference; and that alternating positive and negative currents are transmitted many times more rapidly than successive impulses of the same character. After being laid, the wires were first worked by the Ruhmkorff induction coils and a Smee's battery, and afterward with a Daniell battery; but the current was for the most part so weak as scarcely to work the most delicate relay, susceptible to an impulse that can hardly be perceived on the tongue. The effect was indicated at the Newfoundland station by the deflection of a delicate galvanometer, and at Valentia in Ireland by that of the reflecting galvanometer of Prof. William Thomson, the effect of which is to multiply the movement in a ray of light reflected from a mirror attached to a very delicate magnetic needle. This ray being thrown upon a surface at some distance, a movement of the needle, that is otherwise imperceptible, may be even measured upon a graduated scale. The transmitted current was, much of the time that the cable continued in action, so weak that every expedient of this kind was necessary to render the signals perceptible. From the first there appears to have been a defect in the part of the cable laid toward the Irish shore, and this caused a temporary interruption of the communications that passed between the ships, and excited much fear for the result of the enterprise until these were soon renewed; and it is generally believed that the very imperfect signals and variable conditions of the cable during the time that signals passed through it from Aug. 13 to Sept. 1 were attributable to this original defect, at least as the main cause. During this time 129 messages were sent from Valentia to Newfoundland, and 271 from Aug. 10 in the other direction. The number of words in the former direction were 1,474, and in the latter 2,885. The message from Queen Victoria to the president of the United States, consisting of 99 words, occupied in its receipt at Newfoundland 67 minutes. The rate of reception of messages at the two stations was however very variable, the signals being often unintelligible and requiring several repetitions. The retardation consequent upon the phenomena of induction, incident to the wire assuming the character of a Leyden jar, was considered by W. T. Henley, telegraph engineer, of London, so great that in the most perfect cable across the Atlantic no more than 4 words per minute under the most favorable circumstances could be transmitted on the plan of the dots and lines; but if a letter could be indicated by one or two signals, the rate of course would be proportionally increased. The feebleness of the current through the cable in consequence of any defect rendered its working liable to be interrupted by the natural currents of electricity in the earth, which by induction excite in an insulated wire currents moving in a contrary direction to their own, and overcome any artificial electricity of little force in the conductor. The changes in the natural currents from positive to negative and back again may be often mistaken for those transmitted from the opposite station. With perfect insulation the natural currents would in general be overcome by the greater power of the battery. On the failure of the cable to communicate intelligible signals, every effort was made to ascertain the exact cause with a view of remedying the defect if possible. The most able electricians were sent to Valentia, and the most powerful batteries, as well as the great magneto-electric machine of Mr. Henley, were applied to test the condition of the cable. On Oct. 20, in the course of these trials, a communication was received at Valentia and imperfectly read as follows: "Two hundred and forty t- k——— Daniells now in circuit." These were the last intelligible signals transmitted through the wires, and it afterward appeared that the full message was: "Two hundred and forty trays and seventy-two liquid Daniells now in circuit." The power thus employed was more than 1,000 times what would be required in an ordinarily well insulated conductor to give perfect signals to the mirror galvanometer; and the hopelessness of further attempts to transmit through the cable was apparent unless the faulty points could be repaired. The report of Mr. Henley of Sept. 30, 1858, to the directors of the Atlantic telegraph company, is full of interesting information as to the methods employed and the principles involved in these experiments. To the end of the cable a voltaic battery was connected by one of its poles, a galvanometer was placed in the circuit, and the other pole was connected with the earth. The current being then transmitted, the resistance it meets is indicated by the deflection of the galvanometer. The comparative resistance of the cable and that of a given fine copper wire being known, which for one of No. 40 gauge may be as 175 to 1, and the degrees of deflection caused by the cable being accurately read, with batteries of different degrees of strength, the processes are repeated with coils of fine wire, the length of which is added to or diminished until the readings of the galvanometer exactly coincide in every case with those noted when it was connected with the cable. The length of the fine wire will then give that of the cable to the extreme end of the circuit, or to the point where the battery current leaves it to return through the earth. By this method chiefly the electricians came to the conclusion that the fault in the cable was about 279 m., or not more than 300 m., from Valentia; and they also inferred that the wire was not separated, inasmuch as obscure signals were received through it from the other station. This, and the establishment of a current through the wire and back by the earth, also proved that the copper wire could not at the faulty place have come in contact with the iron covering of the cable. The impossibility of raising the cable from deep water without breaking it rendered any attempt to remedy the defect hopeless. Portions of the cable in Trinity bay on the Atlantic side were recovered in 1860, and in the short time that it had been submerged the iron covering was found to be much eaten by rust, so as sometimes to fall off as the cable was hauled in. In those parts that were wrapped with tarred yarn the iron wires were preserved bright and free from rust. The gutta percha and copper wires seemed to be in as good condition as when the cable was laid. The cost of the Atlantic cable was as follows: for 2,500 m. at $485 per mile, $1,212,500; for 10 m. at $1,250 per mile, $12,500; and for 25 m. shore ends at the same price, $31,250; making altogether $1,256,250. The expenditures of the company up to Dec. 1, 1858, had amounted to $1,834,500.—After the failure of this great enterprise the attention of some telegraphers was directed to the practicability of extending a cable across the Atlantic from Labrador to Scotland, by way of Greenland, Iceland, and the Faröe islands. The route is about 1,800 m. long, and would present no continuous length of submarine cable for a greater distance than that between Labrador and Greenland, which is about 600 m. Mr. T. P. Shaffner, of the United States, had obtained in 1854 from the king of Denmark a concession of exclusive rights in Greenland, Iceland, and the Faröe islands for this purpose. Failing to interest the government of the United States, Mr. Shaffner chartered a vessel and sailed from Boston, Aug. 29, 1859, to make the preliminary surveys at his own expense. After his arrival in Glasgow, Scotland, the project was brought before the British government, and in June, 1860, a steamer of the royal navy was despatched to take the deep sea soundings, and a private steam yacht was also sent to examine the landing places for the cables and the proposed overland routes. Mr. Shaffner with this expedition again visited the islands and the interior of Greenland, and it is said that a report favorable to the route was carried back to England. No further steps however have yet been taken for establishing this line, and the prospects of its being constructed are not encouraging. The failure of a number of submarine lines, some of which are named below, causes great distrust as to the practicability of keeping up a telegraphic communication across the Atlantic with the knowledge and resources at present available; and the whole subject was generally regarded as abandoned, when, in Feb. 1862, Mr. Cyrus W. Field again visited London with the view of carrying out the original enterprise. He there received from Messrs. Glass, Elliot, and co., manufacturers of most of the submarine cables that have been made, favorable propositions for furnishing and laying a good and durable cable, in the practicability of which they showed their confidence by offering to share the risk. The cable which they laid for the French government between France and Algeria, 520 m. in length, they state, is in perfect and successful working order, under water as deep as any between Newfoundland

and Ireland; and they refer to the following list of cables manufactured and laid down by them, all of which, except three short lines, broken by ships' anchors, are in successful operation:

Date when laid.	From	To	Conductors.		Size of G. P. per Birmingham wire gauge.	Outside wires.		Length of cable in statute miles.	Length of insulated wire in statute miles.
			No.	Size.		No.	Size.		
1854	Sweden	Denmark	3	16	No. 2	10	2	12	36
1854	Italy	Corsica	6	16	1	12	1	110	660
1854	Corsica	Sardinia	6	16	1	12	1	10	60
1855	Egypt		4	16	2	10	1	10	40
1856	Newfoundland	Cape Breton	1*	..	1	12	9	85	85
1856	P. Edward's island.	New Brunswick	1*	..	1	12	9	12	12
1857	Norway, across	Fiords	1*	..	1	10	6	49	49
1857	Across mouths of..	Danube	1*	..	1	12	9	3	3
1858	England	Holland		13	0	10	00	140	560
1858	England	Hanover	2*	..	3	12	6½	280	560
1858	Norway, across	Fiords	1*	..	1	10	6	16	16
1859	Alexandria		4	16	3	10	1	2	8
1859	England	Denmark	3*	..	3	12	5½	350	1,050
1859	Sweden	Gottland	1*	..	1	12	9	64	64
1859	Folkstone	Boulogne	6*	..	3	12	0	24	1,44
1859	Liverpool	Holyhead	2	16	3	12	6	25	50
1859	Across rivers	In India	1	13	0	9	2	10	10
1859	Malta	Sicily	1*	..	1	10	5½	60	60
1859	England	Isle of Man	1	16	2	10	6½	36	36
1860	Jersey	Pirou, France..	1*	..	⅜	12	5½	21	21
1860	France	Algiers	1*	..	0	10	14†	520	520
1860	Corfu	Otranto	1*	..	0	10	5½	80	80
1861	Toulon	Corsica	1*	..	0	10	14†	60	60
1861	Malta	Alexandria	1*	..	in. ½	18	11	1,518	1,518
Total								3,497	5,702

* Strand. † Steel covered with hemp.

The line from Malta to Alexandria is laid in sections by direction of the British government; the manufacturers would have preferred to make it a single continuous line. The gutta percha company of London also express full confidence in the successful working, and their readiness to guarantee this, of one of their manufacture. England is connected with the continent by 7 submarine cables. The line from Dover to Ostend, laid in 1852, is 75 m. long, and contains 6 wires. The lines laid in the Black sea in 1855, for communication between the Crimea and Constantinople, were in two sections, one from Constantinople to Varna, 200 m. long, and one from Varna to Balaklava, 150 m. These contained but one wire each. Their cost when laid was £22,000, and they worked with complete success. In 1857 a line was laid, at a total cost of £125,000, from Malta to Corfu in the Mediterranean, on which 400 m. of cable similar to that adopted for the Atlantic route was paid out. This is reported to have failed. The Dutch laid down a cable in 1861 between Batavia and Singapore, a distance of 660 m.; and after conveying a few messages it was several times broken by anchors or coral reefs, and was finally abandoned. The English government a few years since attempted the establishment of a line through the Red sea to connect the telegraphs in India with those of the Mediterranean. This proved entirely unsuccessful, never conveying even a single message throughout, and the project was abandoned, although the government had given a guarantee of 4½ per cent. on £1,000,000 for half a century. A project to connect Falmouth in England with Gibraltar was abandoned after the cable had been made for this purpose at a cost of £400,000. All these failures are explained chiefly through the neglect of the parties employed in laying the cables, and in no case through insuperable natural obstacles. The Atlantic cable was no doubt originally defective, and was injured beside, first in the way in which it was exposed to the sun, and afterward in the handling, and finally in the laying. Its weight was about 19 cwt. per mile. Some of the earlier cables were much heavier—even 7 tons per mile. For cables to lie in deep water, where no disturbance from anchors, currents, or drifting materials is likely to reach them, great weight beyond that required to sink them is considered of no especial advantage, and the heavy iron coating is found to be altogether useless; but near the shore cables of greater strength and weight are required to withstand the disturbing causes to which they are exposed.—The principles of the electric telegraph are treated in many of the works on electricity, and the ablest papers upon this subject by the most eminent electricians are found in the volumes of the transactions of the scientific societies of Europe. Of the works specially devoted to this subject may be named "The Electro-Magnetic Telegraph, with Reports to Congress," by A. Vail (Philadelphia, 1845); "The Electric Telegraph, its History and Progress," by Edward Highton, C. E., a number of Weale's series (London, 1852); "Historical Sketch of the Electric Telegraph," by A. Jones (New York, 1852); "The Electro-Magnetic Telegraph," by L. Turnbull (Philadelphia, 1853); "The Telegraph Manual," by Tal. P. Shaffner (New York, 1859); and "History, Theory, and Practice of the Electric Telegraph," by George B. Prescott (Boston, 1859).

TELEKY, or Teleki, László, count, a Hungarian patriot, born in Pesth, Feb. 11, 1811, died there in the night of May 7–8, 1861. Belonging to a family distinguished by its possessions and connections in Hungary and Transylvania, as well as by political and literary merits, he early prepared himself for a political career, studying at Pesth and Patak, gained a reputation for rare attainments, contributed to political and miscellaneous periodicals, and in 1837 was elected a corresponding member of the Hungarian academy, of which his half brother Count Joseph Teleky (born 1790, died 1855), the author of the great history of "The Age of the Hunyadys," was the president. In 1842 he published his *Kegyencz* ("Favorite"), a drama, which has since successfully maintained itself on the stage. Having been for some years a member of the diet of Transylvania, he in 1843 took his seat in the upper house of that of Presburg, where he soon became prominent for his eloquence, boldness, decided opposition to the rule of Metternich, and a consistent advocacy of liberal reforms. He subsequently became president of the "Opposition Club" at Pesth; and on the advent of his party to power in 1848 he was elected to the reorganized house of representatives, in which he sided with the radicals. In Sept. 1848, he was sent as envoy of the Hungarian government to Paris, where he published *Le bon droit de la Hongrie* (1849), and zealously but vainly strove to gain the recognition by the French government of the independence of Hungary, on its proclamation at Debreczin. After the close of the Hungarian war, residing alternately in Paris, Brussels, and Geneva, he continued active in rousing the sympathies of the western nations for the cause of his country by contributions to the press, and in securing by personal representations the moral support of men of high standing. He gained easy access to the French court, during the war of 1859 was a member of the Hungarian national committee in Italy, and toward the close of the following year secretly repaired to Dresden. Here he was arrested by the Saxon police, and surrendered to the Austrian government, who 10 years before had sentenced him to death. The changed condition of affairs in that empire, however, made the execution of the sentence a political impossibility, and the emperor Francis Joseph, in a personal interview with the prisoner (Dec. 31, 1860), restored him to liberty on the promise of severing his connection with the Hungarian refugees and of abstaining for a time from political agitation. The returned exile was received by his countrymen with the liveliest demonstrations, and was soon elected by his former constituents to the newly convoked house of representatives. The diet was opened April 6, 1861, and the leader of the more moderate supporters of the laws of 1848, Francis Deák, prepared an address to the monarch, on which the debates were to open on May 8. Teleky, the leader of the radicals, who opposed any measure looking like a recognition of Francis Joseph as king of Hungary, and any advances on the part of the house toward a compromise, prepared an elaborate and statesmanlike discourse on the situation, in opposition to the address. This discourse was found on his desk, on the morning of the 8th, and near it on the floor the dead body of the writer, pierced by a pistol ball. Doubts on the expediency of his almost revolutionary policy, scruples concerning his word of honor pledged to the emperor, and bodily suffering are believed to have induced him to commit suicide. When the president of the house announced the catastrophe, several of its members burst into tears and the session was suspended. The debate on the address was commenced later, and after a protracted contest Deák's proposition was carried.

TELEMACHUS, a Greek prince of the heroic age, the son of Ulysses and Penelope. When Ulysses went to Troy, Telemachus was an infant, and in his father's absence he grew nearly to manhood. About the time that the gods had decreed the father's return home the son made an unsuccessful endeavor to eject the troublesome suitors for his mother's hand, and then set out to seek information of his long absent parent. Accompanied by Minerva, who had assumed the appearance of Mentor, a faithful friend of his father, he visited Pylos and Sparta, and was hospitably received by Nestor and Menelaus. From Sparta Telemachus returned home, and on his arrival found his father with the swineherd Eumæus, disguised as a beggar. Their mutual recognition followed immediately, the suitors were slain or driven out, and Telemachus accompanied his father to the aged Laërtes. He is called by different authors the father of Latinus, and the founder of the town of Clusium in Etruria.

TELEOSAURUS, a genus of fossil crocodilians of the secondary epoch established by Geoffroy, differing from the living crocodiles in having biconcave vertebræ. The general form of the cranium was that of the gavials; the nostrils opened anteriorly at the end of the muzzle and posteriorly on a level with the jugal arch; the lower jaw was spoon-shaped at the end, with teeth on the sides like canines, the other teeth being small, equal, conical, and adapted for seizing a fish prey; the body was protected by larger and more solid plates, the anterior limbs were smaller, and the posterior more fin-like than in the present crocodilians. The strata which enclose their remains indicate a marine habitat, and their habits were probably those of the gavials. The genus has been divided by modern palæontologists into several subgenera, as given by Pictet. In the lias is found *mystriosaurus* (Kaup), having a very long muzzle, flattened head, and eyes directed upward. The *T.* (*M.*) *Chapmanni* (König), from the upper lias of Yorkshire, England, is described in the "Philosophical Transactions" of 1758; the vertebræ were 64, 16 being dorsal, and the teeth about 70 in each jaw; some of the dermal plates were 8½ inches in their transverse diameter; it attained a length of about 18 feet. *Macrospondylus* (H. de Meyer) had longer vertebræ and the S-shaped femur not longer than the leg; *pelagosaurus* (Bronn) had the eyes more widely separated, a shorter symphysis of the lower jaw, and the anterior limbs relatively small. The name has been generally restricted to the species found in the oolite, especially the *T. Cadomensis* (Ét. Geoffr.), or crocodile of Caen, from the limestone of Normandy. This is characterized by large orbits near together, a flattened muzzle 5 times as long as wide, very long transverse processes of the dorsal vertebræ, and thick rectangular scales forming 10 regular series, each containing 15 or 16; it must have attained a length of 20 feet. Other genera are *glaphyorhynchus*, *æolodon*, and *gnathosaurus* of H. de Meyer. The *T. longirostris* (Ét. Geoffr.) was found in the kimmeridge strata of Havre and Honfleur, and described by Cuvier in his *Ossemens fossiles*.

TELESCOPE (Gr. *τηλε*, far, and *σκοπεω*, to view), an optical instrument designed to aid the eye in viewing distant objects, causing them to appear magnified by enlarging the angle under which they are seen, and at the same time increasing their brightness by collecting into the eye a greater number of rays than would naturally enter it. To this instrument we are indebted for almost every item of our knowledge respecting the physical appearance of the heavenly bodies, while to the navigator, the explorer, and the engineer, it is a powerful and often indispensable auxiliary, either as an instrument of research or when adapted to instruments of observation.—The general construction of the telescope is based upon the well known property possessed by a convex lens or concave mirror, of converging to a focus the rays of light falling upon it from any object, and of forming at that focus an image of the object itself. This image may be rendered visible, as in the camera obscura, by interposing at the focus a white screen, a plate of ground glass, or, still more strikingly, a cloud of light smoke within which the image will appear suspended. But if the rays be allowed to proceed without interruption, and the eye be placed in the axis of the lens or mirror and at the proper distance from the focus, the image will be seen more distinctly than before; and if the focus be nearer to the eye than to the lens, the apparent dimensions of the image will be greater than the apparent dimensions of the object itself. This is the simplest, though not the common form of the telescope. Usually a second lens, of shorter focus than the first, is introduced near the image, the effect of which is to increase still further the apparent magnitude of the object; and thus is constituted the ordinary telescope, which, in its elementary construction, consists of an "object glass" or "object mirror," of as large dimensions as practicable, and an "eye lens," which enables the eye to receive the image under the greatest practicable angle. The object glass is always necessarily convex, and the mirror concave, but the eye glass may be either; if convex, it is placed at the proper distance beyond the focus, and, the rays having crossed, the image then appears inverted; if concave, as in the common opera glass, it is placed within the focus, and objects appear in their natural position. The magnifying power of the instrument is measured by dividing the focal distance of the object glass by that of the eye piece; the illuminating power depends mainly on the size of the object glass.—English writers are fond of alleging that the telescope was certainly known to Roger Bacon and used by Digges before the 17th century, but the first really definite accounts of the invention date from the latter part of the year 1608. Magnifying lenses had long been known, and even the compound microscope had been invented by the Jansens nearly 20 years before this date—a discovery which has somewhat embarrassed the study of the question before us from confusion of the by no means explicit terms with which both instruments are described. But it is now generally conceded that the honor of having made the first telescope belongs to one of two individuals, Hans Lippersheim, a spectacle maker in Middelburg, and Jacob Adriansz, called also Metius, a native of Alkmaar. The former of these, on Oct. 22, 1608, presented to his government three instruments with which "one could see things at a distance," applying at the same time for a "protection" or other equivalent for a patent. Metius made a similar present and a similar application later in the same month, but said that he had manufactured such instruments two years before. It has been frequently stated that Zacharias Jansen also invented the telescope more than a year later; but the evidence adduced only proves, according to Olbers, that he made telescopes which may have been imitated from those of Lippersheim; and this is the more likely as both were spectacle makers in the same city, and it is hardly possible that the public transaction with the latter could have escaped the knowledge of Jansen. The attempt was made by the states-general, it is said, to retain to themselves the knowledge of this invention, whose importance in war was at once perceived by Prince Maurice; but it is also said and believed that the French ambassador soon succeeded in obtaining from them an order for two telescopes for his own government. It is certain that the report of the invention soon spread abroad, and the new and wonderful instruments found their way to London, Paris, and even Venice. But by no person in any city was the idea more eagerly welcomed, or its great importance more quickly recognized, than by Galileo, then visiting at the last named place. He was evidently willing, at a later day, to be thought the second inventor, guided only by an uncertain rumor; but it is reported by some that he actually saw one of the Dutch telescopes, and Huyghens, referring to the matter, declared that the man who could invent the telescope unguided by chance would be more than mortal. Whether seeing the instrument or not, however, his sagacious intellect fully appreciated the great scientific value of the invention; and returning to Padua with some lenses, he immediately began to improve upon what he had seen, if not to experiment independently, under guidance of the mere report, and he soon found a better and more certain result than had been chanced upon by the original inventor. He made a leaden tube, and fitted at one extremity a plano-convex lens for object glass, and at the other a suitable plano-concave for eye piece. This, his first telescope, magnified only three times; he then made another of more than double this power, and soon after, with a magnifying power of 30, the "Tuscan artist" betook himself to the study of the heavens, where his first discoveries excited more wonder than that of the "optic glass" itself. The popular curiosity excited by both was so great, as he himself tells us, that he was compelled night after night, though wearied, to stand by his glass to show its wonderful performances to the curious. But we can scarcely form a conception of the importance to science of the new invention. The phases of Venus, questioned hitherto, were revealed to sight; the satellites of Jupiter and the oblong shape of Saturn were distinctly seen; the lunar mountains were measured; spots were found upon the sun's disk; the milky way was resolved into stars; and on every side paths were opened for entering upon new and more correct views of the constitution of the universe. In 1609, the same year in which Galileo's telescopes were made, others found their way into England, and were soon sought after with an avidity that was stimulated by the report of Harriot's discoveries. This young astronomer, with zeal and enthusiasm no whit inferior to Galileo's, made drawings of the moon, discovered the satellites of Jupiter, and observed the spots upon the sun. The new "cylinders," as they were called, were soon in general use, and amateurs were greatly delighted with the new aspects of the heavenly bodies, especially of the moon, where they found luminous points "like starres" appearing separated from the main illuminated portion of the new moon, and where, as one expresses himself, "the whole brimme along lookes like unto the description of coasts in the Dutch bookes of voyages." Telescopes were also exposed for sale in Paris in the early part of the same year.—It is generally supposed, in the absence of evidence to the contrary, that these first telescopes were all, like Galileo's, made with a concave eye lens, a construction in which, as has been said already, objects appear in their natural position, but with a very limited field of view. Kepler, in 1611, suggested the use of a convex eye lens; but the first actual application of one was made by the capuchin Schyrle de Rheita, who describes it in his work *Oculus Enoch et Eliæ* (1645). This eye lens gives a much larger field of view, but shows objects inverted. On the other hand, the Galilean telescope possessed the advantage of greater distinctness and brightness than was found in the "astronomical" form. It was imagined by some that a sort of interference of rays took place at the crossing point, and at first sight, and while the true cause of the indistinctness was unknown, the opinion appeared plausible. Even as late as 1776, the elder Herschel thought it worth while to disprove this idea by an actual experiment, devised with his characteristic ingenuity. The true cause of the advantage of the Galilean form is now known to lie in the partial compensation by the negative eye piece of the aberrations caused by the object glass, the result being in this case the difference, while in the astronomical telescope it is the sum, of the aberrations of the two lenses. Rheita invented also the binocular or double telescope, a construction which frequently recurs afterward, but always as a thing of curiosity rather than of practical utility until in modern days, as the double opera glass or lorgnette, it has become serviceable in reconnoissances, terrestrial and celestial.—The very first attempts to gain magnifying power and light, by enlarging the object glasses of telescopes, revealed a most unexpected and formidable obstacle. It was found that all objects appeared strongly tinged with prismatic colors. This obstacle remained unexplained until the time of Newton, and unconquered more than half a century longer; and the final victory over it will ever remain as one of the great achievements of the human intellect. But if at the time insurmountable, it did not prove unavoidable, for it was ascertained that by making the focal distance of the object glass very great in proportion to the diameter, the colored fringes could be reduced so as to become practically imperceptible. Enormously long telescopes were therefore constructed, and it was with them that the brilliant discoveries of that day were made. Huyghens used telescopes of his own manufacture, and one of his object glasses, 123 feet in focal length, is still to be seen in the library of the royal society of London. English makers also produced telescopes of nearly equal dimensions, and Auzout in Paris spoke of surpassing all others, but it does not appear whether he succeeded or not. The elder Campani, at Rome, made lenses of from 70 to 136 feet focus, and with these Cassini discovered 4 of the satellites of Saturn, an addition to astronomical knowledge which was thought worthy of commemoration by a medal. Beside the lenses of Campani, some of which are still preserved in Paris, Cassini used also others made by Borelli of 40 and 70 feet, and by Hartzoecker of not less than 250 feet focus. These object glasses were used without any tube, the lens being placed upon a mast, or, as Cassini recommended, at the angle of a tower, and controlled, not without considerable difficulty, by cords leading to the observer at the eye lens.—The source of the inconveniences attending the use of shorter lenses was generally supposed to lie wholly where it did really lie in part, in the imperfect collection of the rays of light, which were at that time believed to be homogeneous, into a simple focus. It was distinctly understood that the rays which passed through a lens near its centre would not be refracted to precisely the same point with those which pass through it near its circumference; that is, there would be what is technically called spherical aberration. This is a true cause, but by no means the whole cause of the indistinctness of images in the telescope. Accordingly, with that belief, it was thought the evil might be remedied by grinding lenses with other surfaces than spherical, and machines were devised by Descartes, by Hevelius of Dantzic, by Du Son of London (who ground deep parabolic concave lenses, with which he asserted that telescopes might be used "with full aperture," and yet show no colors), by Sir Christopher Wren, and others. The main reliance of the astronomer however until near the close of the century was in the aërial telescope, with which, unwieldy though it might be, many brilliant discoveries were made.—An improvement, of more importance than that of the figuring of lenses, consisted in the modification of the eye piece. By the introduction of more than one convex lens, Rheita had reinverted the image; but this was all the gain that either he or Kepler, who also proposed the same thing, seems to have expected. In fact, there resulted an increase of aberrations which begat distaste of the plan, and it was not until about 1659, when Huyghens invented the combination which still bears his name, that much advantage was gained by multiplying lenses. This eye piece is composed of two convex lenses, whose focal lengths are as 3 to 1, and which are separated from each other by an interval equal to half the sum of these focal lengths; the place of the telescopic image being between the lenses. This arrangement was found to have a remarkable advantage in point of distinctness over the single eye glass, by reason of the apportionment of spherical aberrations between the lenses, and the consequent less amount of injurious effect in the result, while no addition whatever was made to the color of the images formed by the object glass. To this day the "Huyghenian eye piece" remains one of the best combinations for ordinary viewing purposes. Another eye piece, less successful, however, was constructed by Campani with 3 lenses so arranged as to show objects "without any iris or rainbow colors."—In the form to which the refracting telescope had now been brought, it remained full three quarters of a century without further material improvement. But during this interval, by the application of the telescope to instruments of observation, astronomy was continually gaining in the accuracy and extent of knowledge respecting the positions and movements of the heavenly bodies. Morin, professor of mathematics in the college of France, first in 1634 attached a telescope to the moving index of a graduated arc, in order, as he says, "to measure the fixed stars quickly and accurately." He was also the first to gain sight of stars in the daytime. Having, one morning in the early twilight, directed a 1½ foot telescope attached to the alidade of a planisphere upon Arcturus, he followed the star until after the sun had risen; and finding that it still continued visible, his joy was so demonstrative that his instrument was displaced and the star lost. He afterward succeeded in following Venus and other planets, as well as several fixed stars, into the daylight. But it was only after the introduction of fixed threads into the field of the telescope, that it became a really useful auxiliary to instruments of measurement. At the present day it seems at first strange that astronomers should have preferred the simple "sights" or "pinnules," with which they had always been accustomed to observe, to the far more accurate perception furnished us by the telescope; and yet they, without any means of designating the centre of the field of view, and with only the feeble optical power at their command, were right in their preference. Even as late as 1673, Hevelius, who had spent a long life in the construction and use of large instruments, as well as telescopes, argued earnestly in favor of the pinnules for observing—not, as stated by Whewell, because it would make all the old observations of no value, but rather from a want of confidence in the new method, which he said had not yet proved itself superior, especially in the case of comets. A controversy upon this question arose between him and Hooke, in consequence of which Halley was requested to visit Dantzic and make actual comparison of the two methods. He did so, when it appeared that Hevelius had acquired such skill in the use of his favorite method, that the difference of their observations seldom exceeded a few seconds, and in no case amounted to so much as a minute! As early as 1641, Gascoigne, an accomplished young English astronomer, had applied fixed threads to the telescope. In a letter to Crabtree he says that he has fitted his sextant "by the help of the cane (tube), two glasses in it, and a thread, so as to be a pleasant instrument." The object he had proposed to himself was the improvement of the lunar theory, and he "doubted not in time to be able to make observations to seconds." He had also at this time invented the wire or filar micrometer, in the details of which it is pleasant to find not merely mechanical ingenuity, but also a true appreciation of the astronomical requirements of such an apparatus; and there is no doubt that, had the inventor lived to make a more extended application of his contrivance, the results would have been of high value. Gascoigne perished untimely at the battle of Marston Moor, and his invention, of which no account had been published, and which does not seem to have been sufficiently appreciated at the time, remained forgotten until nearly 30 years after, when an opportunity for reclamation occurred upon the reinvention of the micrometer by Auzout. It was about the same period that Roemer gave to the telescope one of its most important applications, by attaching to it an axis at right angles to its length, and placing it so as to revolve in the plane of the meridian; and shortly afterward Picard in Paris, and Flamsteed at Greenwich, following up this capital idea, commenced a new era in observation. For a more detailed account of this application, see TRANSIT CIRCLE.—Mersenne, in his correspondence with Descartes, had before the year 1639 suggested the practicability of using a concave mirror instead of the principal lens in the telescope; but the idea appears to have been unfavorably received by the latter. In 1663 James Gregory, of Edinburgh, published, in his work entitled *Optica Promota*, the plan of a reflecting telescope, consisting of a concave mirror, perforated in the centre, by which the rays were to be converged to a focus before it, and after crossing would be received upon a second small concave mirror, be reflected back by the latter, and, crossing again near the opening in the first reflector, would be there received by a lens and thus transmitted to the eye. The rays having crossed twice, objects would appear in their natural position. An attempt was actually made to construct one of these telescopes; but owing to want of a proper appreciation of the extreme nicety required in the figures of the mirrors, and in the relative adjustment, no satisfactory result was obtained. In 1671 Newton took up the study. By those beautiful and simple experiments, the account of which in his own words so highly claims our admiration, he soon found the true cause of the prismatic colors which had proved such a stumbling block to the progress of the instrument, and arrived at the conclusion "that the perfection of telescopes was hitherto limited, not so much for want of glasses truly figured according to the prescriptions of optic authors, ... as because that light itself is a heterogeneous mixture of differently refrangible rays. So that, were a glass so exactly figured as to collect any one sort of rays into one point, it could not collect those also into the same point which, having the same incidence upon the same medium, are apt to suffer a different refraction." Abandoning therefore as hopeless all further attempts at improvement in this direction, he was led "to take reflectors into consideration," since here there would be no separation of colors; but inasmuch as any irregularity of figure in a concave mirror would produce greater distortion in the image than would be the case with a lens, "a much greater curiosity would be requisite than in figuring glasses for refraction." The Gregorian construction, mentioned above, appeared to him to have such disadvantages, that he "saw it necessary to alter the design, and place the eye glass at the side of the tube." Having then found an alloy of copper and tin which appeared to possess the requisite qualities for mirrors, and having also devised a "tender way of polishing proper for metal," he attempted the construction of a reflecting telescope upon the plan which has ever since borne the name of Newtonian, and soon succeeded in making an instrument with which he could discern the "concomitants" of Jupiter and the phases of Venus. Another one made soon after, having a speculum of 1⅓ inches diameter and 6⅓ inches focus, was presented by him to the royal society of London, by whom it is still preserved. In these telescopes the mirror is placed at the lower end of the tube, whence it reflects the rays forward toward a focus; but before reaching this point, their course is diverted by a small plane mirror inclined to the axis at an angle of 45°, so that the image is formed at the side of the tube near its mouth, and is there viewed by the eye lens, so that the observer looks in a direction at right angles to that of the object. In the same year that Newton's telescopes were made, Cassegrain, a Frenchman, proposed still another construction, which bore a similar relation to the Gregorian that the Galilean refractor does to Kepler's. The large mirror was perforated, but the rays proceeding from it were, before reaching their focus, received upon a small convex mirror which sent them back with less convergence to form the image near the eye piece. It was asserted that this form, which, like Gregory's, was not immediately brought into use, would possess several advantages over the Newtonian; but the English philosopher showed that these advantages were rather objections, and that the difficulty of properly working the mirrors would always be a serious obstacle to their general acceptance. In fact, we hear little more of them until some 70 or 80 years later, when Short, a celebrated artist of Edinburgh, revived their manufacture, and, by his peculiar skill in figuring and mutually adapting the mirrors, "marrying them," as he termed it, brought them into favor for a time. But practical difficulties, especially in the manipulations of the large speculum, interposed for many years to prevent even the Newtonian construction from coming into general use. It was known indeed that in order to reflect all the rays accurately to the same focus, the figure of the mirror should be not spherical but parabolic; but no method was known whereby this figure could be attained with certainty. At length, in 1718, Hadley succeeded in making a mirror 6 inches in diameter and with a focal length of 62 inches, which bore a magnifying power of 230. This instrument may be considered to have established the reputation of reflectors; for on being compared by Bradley and Pound with the 123-foot aërial telescope of Huyghens, it proved fully a match for the refractor, except that the latter showed objects somewhat brighter. But those practised observers were able to see nothing with the Huyghenian telescope which they could not see also with the reflector, and sometimes the latter had the advantage. After this period reflectors came rapidly into general use, and have ever since, as indeed they were from the first, been the favorite kind of telescope in England. Their construction was greatly facilitated to practical men by the appearance in 1777 of an elaborate memoir by Mudge, giving a detailed account of his process of making and finishing specula; a memoir for which the author received the royal society's gold medal. Another important memoir upon the same subject by the Rev. John Edwards, was published in the appendix to the "British Nautical Almanac" for 1787.—About the year 1766 a small telescope, only two feet in length, fell into the hands of a German organist residing in England. His curiosity and zeal were both aroused; he sent to London for a larger instrument, and, finding its cost too great for his then limited means, undertook to make one for himself. The organist was the elder Herschel. With rarely equalled perseverance and mechanical ingenuity, he devoted all the time at his command to the manufacture of reflectors. Improving continually upon his successive results, and with increasing means at his disposal, he made many Newtonian reflectors, some even as large as 20 feet, as well as a number of the Gregorian form of 10 feet focus; in the course of all which work he acquired naturally most profitable experience. Astronomical observation also went hand in hand with his mechanical progress, and the pages of the "Philosophical Transactions" bear abundant testimony, not only to his skill and success in observing, but also to the great philosophical powers of his mind. The discovery by him of the planet Uranus, in 1781, brought him to the favorable notice of George III., by whose liberal patronage he was enabled in 1785 to undertake the construction of the celebrated 40-foot reflector, which under these auspices progressed rapidly to completion. The instrument was pronounced finished in Aug. 1789, when the labors of the persevering and zealous astronomer received their first reward in the discovery of the 6th satellite of Saturn. The tube of this great telescope was of sheet iron, nearly 40 feet in length, and more than 4 feet in diameter. The speculum, weighing 2,118 pounds, had 48 inches of effective aperture, and was 3½ inches thick. By slightly inclining it, the rays forming the image were thrown to one side of the tube, just beyond its mouth, and there received by the eye piece directly, thus saving the percentage of light ordinarily lost by the second reflection. The motion of this massive instrument was effected by means of a symmetrical arrangement of masts and ladders, which formed a framework or scaffolding within which the telescope could be not only supported, but directed with ease and certainty to any part of the heavens. After the lapse of 50 years, during the latter portion of which the telescope had lain unused, it was dismounted by Sir John Herschel at the end of 1839, and on New Year's eve his family assembled within the tube and sang its requiem. It now rests horizontally upon three stone pillars, a monument to the memory of its constructor.—It would seem that the improvement of the refracting telescope after the middle of the 17th century was long retarded in consequence of the opinion, quoted above, of one whose views were always to be received with deference. Newton evidently conceived that the prismatic rays of light, once separated, could not be recomposed into white light except by the same refraction that had separated them, and that therefore the removal of these colors from a telescopic image was impossible. The opinion was seemingly self-evident, and yet was incorrect. The weight of Newton's authority, however, was sufficient for a time to repress further investigations in this direction; and it was not until 1729 that an Englishman named Hall, guided, it is said, by a study of the mechanism of the eye, was led to a plan of combining lenses so as to produce an image free from colors. Telescopes were made according to his directions, and were said to perform well; but the secret of their construction died with him, and no public account of the facts was given until called forth by later occurrences. In 1747 Euler, referring to the construction of the human eye, declared that a combination of lenses of different media was possible which should give a colorless image, and investigated analytically the curvatures for a lens compounded of glass and water. His result was questioned, singularly enough, by the man from whom opposition might have been least expected, John Dollond, who, relying too implicitly upon Newton's dictum, was contending against his own future fame. His questioning, however, partook more of the nature of the same dictum itself than of argument, and he was soon led to consider the subject more attentively by the remark of a Swedish mathematician, that there were certainly some cases to which Newton's rules did not apply. Thus shaken in his confidence, Dollond undertook experiments, at first with prisms of glass and water, and soon found that when the prisms were so combined that the rays passed through without refraction, they were tinged with the colors; next, arranging the prisms so that the rays appeared without colors, he found them displaced by refraction. Here, then, was in his hands the grand principle which was to make a revolution in the construction of the telescope. He pursued the study, and arrived at the same results by using prisms of crown and flint glass. From prisms to lenses the transition was easy, and his triumph was finally completed, when, having combined a convex lens of crown glass with a suitable concave of flint, he was able to correct the colors and leave sufficient refraction outstanding to produce a telescopic image. And now, singularly again, it was Euler's turn to doubt. He still believed all kinds of glass alike in their optical properties, and that it was only some happy combination of curvatures at which Dollond had arrived. But his doubts soon gave way before experience, and the masterly powers of his analysis were brought to bear successfully upon the problem of the compound object glasses. The subject attracted universal attention, and mathematicians everywhere contributed toward perfecting by theory the requisite conditions of curvature of the lenses. The new telescopes were appropriately called achromatic, or free from color, and henceforth the "dispersive power" of any medium, by virtue of which the differently colored rays are differently refracted—that is, are dispersed from each other—was recognized as independent of the "refractive power," by virtue of which the whole pencil is diverted from its original source. Side by side with the theorists was Dollond with his practical skill. Attempting, in 1758, to make double object glasses of short focal distance to be used with a concave eye lens, he found difficulties in the management of the spherical aberration, whereupon the idea occurred to him of dividing this aberration by having two lenses of crown glass and including the flint lens between them, an arrangement which accomplished the purpose in view, but did not succeed with convex eye pieces also. Afterward, his son Peter, whose own skill combined with his father's inventive genius to render the name of Dollond inseparably associated with the history of the telescope, resumed these experiments, and as a result presented to the royal society of London a triple object glass of 3½ feet focal length and 3¾ inches aperture, with which the telescopic image was pronounced by Short, an excellent judge, to be "distinct, bright, and free from colors." The proper combination of three lenses into a system in which any the least departure from harmonious action will offend the practised eye, if not vitiate the whole action, was of course recognized as a matter requiring the utmost delicacy. A beautiful suggestion was made by Wollaston of a means of testing and correcting the concentric adjustment of lenses. By removing the eye glass of a telescope and viewing any bright object, as a lighted candle, through the object glass, there may be observed at the same time with the refracted image a series of fainter images formed by the second reflections from the different surfaces. It is evident, then, that if the glasses be truly centred, these images will all be in the same straight line; or if there be any error of position of either lens, it will be decidedly manifested, and by proper adjusting screws may be corrected accordingly.—Among the many mathematical solutions of the new problem of the object glasses, the precepts given by Klügel, in his "Dioptrics," commended themselves to the general apprehension, and served as a basis for subsequent fruitful investigations. These precepts were: 1, that the radii of curvature of the first, or crown lens, should be such that the angles of the incident ray with the normal would be equal at both surfaces, which would give for crown glass a ratio of nearly 1 to 3; 2, the radius of the third surface, the first of the flint lens, should be such that the rays of mean refrangibility passing through both the centre and edge of the lens would unite as nearly as possible in the same part of the axis, so that the spherical aberration would be sensibly destroyed; and 3, having determined the outstanding dispersion for the red and violet rays, the fourth surface should be made such as to unite these rays as nearly as possible in the same point with the rest. Early in 1816 Bohnenberger, commenting upon these precepts, showed that, by changing the ratio of the first two surfaces from $\frac{1}{3}$ to $\frac{2}{3}$, the proportion of aperture to focal length could be materially increased without prejudice to the performance of the instrument. Not long after, Gauss remarked that it was possible, theoretically, to construct an object glass which would unite all the rays of any two colors as well as the mean rays at the centre and at a given distance therefrom into one and the same point. Both lenses should be concavo-convex in form, and with a proportion of aperture to focal length of $\frac{1}{13}$ he obtained an almost perfect union of rays. The unusually deep curvatures of the lenses seem to have occasioned some scruples on the part of opticians, and this construction remained almost forgotten for 40 years, until Steinheil, with characteristic boldness, has recently taken up the study, found and conquered the practical difficulty, and has arrived (in 1860) at complete success in the manufacture of the Gaussian object glasses.—The proper construction of eye pieces was also a matter of some consideration. Beside the Huyghenian form already mentioned, and which is only applicable for viewing objects, Ramsden, in 1783, introduced another, which is still used in micrometer observations. It consists of two plano-convex lenses, of equal focus, with their convex surfaces toward each other, and separated by a distance of two thirds of the common focal length. By this arrangement, to which he was guided by a remark of Newton, the essential condition of a "flat field" is gained, and the aberrations, chromatic and spherical, are so much reduced as to be practically insensible. For terrestrial observations, the elder Dollond sought to reduce aberrations and enlarge the field of view, by increasing the number of lenses, and, after having first improved the 4-glass eye pieces already in use, obtained, by adding yet a 5th lens, a combination which very satisfactorily effected both the desired objects.—Among the distinguished names connected with the history of the telescope, some, like those of Euler and Gauss, brought lustre to it; others, like Dollond's, received lustre from it. The name of Joseph Fraunhofer did both. Devoting the labors of a life (see FRAUNHOFER) all too short for science to the improvement of the achromatic telescope, he studied the theory of light and the laws to which it was subject in transmission through various media, and, by aid of his own ingeniously devised apparatus, gained perfect familiarity with all its modes of action. Then, fully appreciating the obstacles to practical application of this knowledge, lying in the difficulty of procuring disks of homogeneous flint glass, his mechanical ingenuity contended successfully against this difficulty. The process by which his glass was manufactured is kept a secret, but it is generally understood that the disks themselves are obtained by selecting and melting together the most faultless specimens from larger masses of the best glass, whose constituent parts however are not known. Having now the glass, he well knew how to combine curvatures to suit its peculiar properties, and the results are to be found all over Europe. His life's labors were fitly crowned by the completion, in 1824, of the splendid telescope for the observatory at Dorpat, a masterpiece which excited no less wonder than admiration. The object glass of this instrument—double and not triple, as stated by some writers—has a clear aperture of 9.6 inches, and a focal length of 170.5 inches. Its optical performance is of the highest character, such that Struve did not hesitate to pronounce it unsurpassed in this respect by any in existence. It gave to the stellar images a perfect sharpness of definition, which enabled it not only to resolve the closest known double stars, but also to discover as double or multiple others that had passed unchallenged before the exquisite 20-foot reflectors and the practised eye of the younger Herschel. But the true hand of the artist was shown in this instrument no less in the mechanical than in the optical part; and the best evidence of his success in foreseeing and meeting every requirement of the astronomer is in the fact that his style of "mounting" the telescope remains to this day essentially unimproved, and has served as the model for subsequent artists. Fraunhofer died at the early age of 39, and the two words inscribed upon his tomb tell the truth: *Approximavit sidera.*—The manufacture of optical glass has received much attention in England. In 1824 a committee was appointed by the royal society to take into consideration the theory and to experiment upon the manufacture of such glass. Their chief labors devolved upon three members, Dollond, Faraday, and Herschel. The first results were reported to the society in 1829. The efforts of this committee were directed to the manufacture of very heavy glass, and they succeeded in obtaining disks of 7 inches, which seemed, so far as tried, to answer all the requirements of the telescope. Dr. Ritchie also devoted much attention for several years to the same subject, and with considerable success, but was prevented by premature death from publication of any of his processes. Mr. Simms, who obtained most of the glass, applied afterward to Messrs. Chance and co. of Birmingham, who had manufactured it according to Dr. Ritchie's instructions, for information relative to the matter, but received only unsatisfactory answers. Judging by the appearance of the glass as it came into his hands, Mr. Simms inferred that it had been fused in moulds and there subjected to pressure. The largest disk had 7⅜ inches diameter, and was ground for use by Simms himself. It was, on trial, found to be "an excellent glass, but not altogether faultless." In this state of difficulty respecting large disks of flint glass, the idea occurred to some that the desired achromaticity might be obtained by separating the lenses and placing the flint at some distance down the tube in the narrowing cone of rays. In 1828 Alexander Rogers proposed to introduce in combination with the crown lens a smaller compound lens of plate and flint glass, in which the refraction is entirely destroyed, and the outstanding dispersion left available for the desired correction of that of the outer lens. The investigation of the requisite curvatures of this compound lens was found to present no peculiar difficulty; and moreover the final perfection of the compensating action could be accomplished by proper adjustment of the relative positions of the lenses, so that less rigorous accuracy is requisite in their mechanical formation. Upon studying the details of construction, Rogers found it probable that a telescope of 18 feet focal length, and with a crown lens of 12 inches aperture, could be made achromatic with a flint lens only 4 inches in diameter. Four years later this same construction was introduced into actual use by Plossl at Vienna, and his success was such as to attract considerable notice. The new form received the name of "dialytic" or separated telescope. One of them, in the possession of Schumacher, having an aperture of 2¼ inches and focal length of 2 feet, was described by him as of extraordinary excellence of defining power. Both Schumacher and Struve, the latter doubtless the best living judge of telescopic performance, said that they had never seen a telescope of equal dimensions that could compare with this. Afterward Struve, canvassing Europe for masterpieces worthy to adorn the new observatory at Pulkowa, visited Vienna, and while there compared a dialytic telescope of 8¼ inches aperture, bearing a magnifying power of 185, with a Fraunhofer telescope of half an inch greater aperture and a power of 210, and was scarcely able to perceive any superiority in the Munich glass. The possibility also of making telescopes achromatic by combinations of other media with glass naturally received due attention. Telescopes with lenses of rock crystal and glass were advertised to be made in Paris by Cauchoix in 1831, and some few came into favorable notice; but, it is hardly necessary to say, the difficulty of obtaining the materials in proper shape and size will be a permanent obstacle to their general manufacture. A better idea was suggested, and carried into practice also, by Dr. Blair, who aimed at something more than the ordinary correction of colors. It had long been observed that, even in the best telescopes, there were residual colors having their origin in the want of a perfect correlation of the colored spaces in the spectra formed by the crown and flint lens; so that if any two colors be made to unite at the same focus, as in the ordinary object glasses, there would not be at the same time a complete union of the rest. This want of correlation is called the "irrationality" of the colored spaces, and its effect is known as the "secondary spectrum." Blair, by a beautiful refinement of the original theory, first made each lens of his object glass independently achromatic, and in such a way that their secondary spectra corrected each other. This he accomplished by using fluid media, two lenses of which were enclosed in combination with three of glass. Moreover, in the course of his experiments, he discovered that muriatic acid combined in proper proportions with metallic antimony gave a spectrum in which the colors had exactly the same proportions as in crown glass; and therefore by enclosing this fluid between two crown lenses, one a plano-convex and the other a meniscus, he obtained the gratifying result of a telescope absolutely free from colors. The name "aplanatic," or without error, was given to this combination. Another fluid-lens telescope, of the dialytic form, was constructed by Barlow, who made use of the high dispersive power of sulphuret of carbon, a beautifully transparent and colorless fluid. He was able to render achromatic a combination of a crown lens 8 inches in diameter with a fluid lens of half the size. There is however a practical objection to the use of sulphuret of carbon arising from the variability of its density by variations of temperature. By actual experiment, Barlow ascertained that in the first mentioned telescope, the refractive index of the fluid would be changed by one tenth of its whole amount by a change of temperature from 32° to 212°. This susceptibility would require a more habitual determination of the corresponding effect upon the value of a revolution of a micrometer screw when one is used with such an instrument.—Reverting to what may be called the regular construction of achromatics, we find that the successors of Fraunhofer at Munich, and Guinand and Cauchoix at Paris, have succeeded in producing object glasses of dimensions far superior to those of the Dorpat lens. Disks of 10, 12, and even more inches in diameter have become familiar to these master opticians, whose skill in working them keeps even pace with their manufacture; and two Munich telescopes, each with more than 15 inches of clear aperture, one at Pulkowa and the other at the observatory of Harvard college, have for years, in the successful exercise of their wonderful powers, been adding richly to the stores of astronomical knowledge.—A few attempts have been made in the United States to manufacture optical flint glass, but they have hitherto been but partially successful, and that with only small disks. But the American-wrought object glasses have earned for themselves a high place. Many have been made in New York by Henry Fitz, and submitted to the test of comparison with Fraunhofer's lenses, size for size, nor are we aware that the test has failed in a single instance. His largest glass, 13 inches in diameter, was made for the Dudley observatory at Albany. Spencer, already famous for the excellence of his microscopic objectives, has made for Hamilton college a 13½ inch telescope, which is highly commended. But in exquisiteness of workmanship and performance, the object glasses made by Alvan Clark, of Boston, have fairly distanced all competitors, native or foreign. Whoever will glance over the list of close double stars discovered with his 7 and 8 inch lenses (see "American Journal of Science," vols. xxv. and xxix.) will remark several stars that must have passed unnoticed under the review of Struve with his superior optical power. Mr. Clark has recently completed a magnificent object glass of 18¼ inches in clear aperture and with a focal distance of 28 feet, the largest in the world, if we except one of 20 inches diameter upon which Porro, in Paris, is said to be now engaged. Mr. Clark's object glass is made from disks of Birmingham glass, which have a uniform density and freedom from veins, and, though only rudely mounted as yet, has already revealed the duplicity of the minute companion of α^2 Capricorni; and in Jan. 1862, it detected a companion to Sirius, perhaps the hitherto invisible one whose workings have been indirectly manifested in the variable movement of the larger star. It is probable that this masterpiece, prevented from reaching its original destination, will now be secured for the observatory of Harvard college.—In England, the attention of the mechanical astronomers, if we may so call them, has been of late years more especially occupied with the construction of large reflecting telescopes, and preëminent in this department is Lord Rosse, who about 1848 completed a telescope which has a clear aperture of 6 feet and a focal length of 53 feet. This enormous instrument has two specula, one about 3½ and the other about 4 tons in weight. At first each rested upon a system of 27 platforms most ingeniously arranged to distribute their support of this enormous weight in such a manner as to produce equal pressure in every position of the instrument. The vital importance of securing this equilibrium of all parts of the speculum is best illustrated by the remark of the maker, that a strong pressure of the hand at the back of a speculum 4 tons in weight and nearly 6 inches thick produces flexure sufficient to distort the image of a star. At a later period 27 triangles, each with a ball at each angle, were substituted for the platforms, so that now the speculum rolls freely on 81 balls. The tube of the telescope is supported upon a massive universal joint of cast iron resting upon a pier of stonework built in the ground, and it is so counterpoised by a chain suspension applied at the centre of gravity, that it can be moved with great facility, a quick motion being given by a windlass below, and a controlling slow motion in either direction by hand of the observer above. Various micrometers have been tried with this instrument, but the common filar micrometer with coarse threads answers best; and such is the quantity of light collected by the immense reflecting surface below, that the threads in the micrometer are always distinctly visible without artificial illumination even in the darkest night. This illustration of the illuminating power of such a telescope reminds us of a similar one related by Herschel, who said that with his 20-foot reflector he could read the figures on the dial of a church clock when the twilight was so far advanced that the tower itself of the church could not be seen by the naked eye. The general processes of casting, grinding, and figuring these large specula have been already described in the article SPECULUM. Several other large reflectors have been constructed by Lassell, De la Rue, and Nasmyth; and very recently the first of these has succeeded in transporting to Malta a Newtonian telescope 4 feet in diameter. De la Rue has successfully applied his large telescopes to celestial photography, in which he has made many important improvements.—The manufacture of reflecting telescopes with glass specula has of late received a new impulse from the discovery by Liebig of a process of coating glass with an infinitesimal film of pure metallic silver. From the first days of reflectors, as early as Newton, we find a proposition to substitute a silvered lens for the metallic mirror of his telescope, on account of the greater perfection with which glass could be wrought, and the greater durability of the polished surface. In 1740 Caleb Smith showed how, with glass mirrors silvered upon the posterior surface, the rays of different refrangibility, after twice passing through the glass, and thus becoming separated, might be united again by the action of a small concave lens placed not far from the focus of the mirror. The elder Herschel sometimes used glass reflectors for his smaller telescopes. In 1822 Airy proposed a combination of two silvered lenses in the Gregorian or Cassegrainian form, and showed how, by proper mutual adjustment of the two, a perfect achromatism might be obtained. In 1838, and again in 1841, Barfuss of Weimar investigated the theory of telescopes with glass mirrors, and found that, of the various forms of reflectors, the Cassegrainian was best adapted for this construction. He demonstrated that in this form both chromatic and spherical aberration may be sensibly corrected in a telescope of 20 inches focus with full 5 inches aperture, and that such a telescope would bear even a power of 600. But by Liebig's discovery a still better field has been opened. His process consists in precipitating the silver upon the glass surface from an alkaline solution prepared by addition of caustic soda to the ammonio-nitrate. After immersing the glass for about three quarters of an hour, an extremely thin and regular film is obtained which has a slight bronzy hue by reflected light, and will transmit a deep blue light when interposed between the sun and the eye. This film is said to be harder than ordinary silver, and, by friction with soft leather and perhaps a little dry rouge, is susceptible of receiving the most brilliant polish externally, while it answers perfectly in figure to that of the glass beneath. Foucault has also made use of a process of similar nature (see SPECULUM), and succeeded in constructing telescopes of considerable dimensions. One was made by him of 13 inches aperture and only 88 inches focus, with which, under a magnifying power of 600, he could separate the components of the small companion of γ Andromedæ. Even now (1862) he is completing for the Paris observatory a silvered mirror of 31 inches diameter, which is not yet definitively mounted, but with which Chacornac has found and measured the position of Clark's satellite of Sirius. Steinheil, investigating the relative reflecting power of a speculum coated by this new process, as compared with others and with the transmitting power of some object glasses, found that, under an angle of reflection of 45°, the amount of brightness obtained was as follows:

Direct light	100
Silvered mirror	91
Quicksilvered glass	76
Metallic mirror, one reflection	67
Herschel gives also:	
Newtonian telescope	44
Gregorian or Cassegrainian	40
Steinheil:	
Object glass by Fraunhofer transmits	76
Object glass by Steinheil	87

But beside the gain in brilliancy, there is another, less important perhaps, but by no means inconsiderable advantage; for we are now able to substitute for the heavy and intractable speculum metal a disk of glass which is far easier to cast and anneal, and being much firmer can be made of less than half the weight of the present mirrors. We may therefore look with confidence for the yet greater perfection of reflectors, and for corresponding progress in discovery.—A beautiful application of glass mirrors, unsilvered, has been proposed by Sir John Herschel and realized by Porro of Paris, for use in observations of the sun. It is customary in these observations to diminish as much as possible the aperture of the telescope, and to protect the eye by using shades of stained glass. Still, great inconvenience is felt from the intense heating power of the concentrated solar rays, which frequently breaks the shades, and, in long continued observation, always causes trouble and straining to the eye. Herschel proposed to use only the very small portion of light reflected from the first surface of glass, by constructing the large mirror of a Newtonian telescope of a double-concave, well polished lens, whose first surface only is truly figured to serve as reflector for the 2.6 per cent. of rays untransmitted and unabsorbed. The lower end of the telescope tube being left open, all the remainder of the light passes out and is dispersed. But even the small amount of reflected rays is still further reduced by the second reflection, which is made to take place at the first surface of a prism whose refracting angle should not be less than 30° or 40°, so that now the portion of light finally reaching the observer is but $\frac{1}{1500}$ of the direct illumination, in consequence of which immense reduction a very light shade only is needed to protect the eye. Porro, in constructing a telescope upon this principle, improved it by placing the prism for the second reflection at the polarizing angle for glass, whereby, upon introducing a Nicol's prism, the light may be enfeebled as much as desired without using any shade at all.—The proper construction of the support or stand upon which the telescope is to rest, and by which it is to be directed to the heavens, is a matter of very great importance; for it has more than once happened that good telescopes have been condemned, and they may frequently be rendered useless, by the defective manner of their mounting. The great requisites of a telescope stand are firmness and stability, combined with a facility of motion which will allow the instrument to be pointed with ease and certainty to any part of the heavens. Fraunhofer, whose plan is now generally followed, adopted the equatorial form, as it is called, which consists essentially of a polar axis upon which the whole instrument is moved parallel with the celestial equator, and which carries in a socket another axis at right angles to itself, upon which latter the telescope moves from or toward the pole. By the combined motions command of the whole visible hemisphere is given, and with the advantage that, the instrument being once directed to a star, the observer can follow it in its diurnal path by motion upon the polar axis alone; moreover, by application of a simple train of wheel-work this motion can be effected by machinery, and the observer is thus enabled at his leisure to contemplate or to measure the objects which appear fixed as though in an immovable sky. This elegant appliance was made by Fraunhofer, who so beautifully and accurately balanced every moving part of his instruments, that the slightest force was sufficient to keep the whole in motion. In the immense English reflectors, the lower end of the tube rests upon the ground or some solid support, and even then for the needful motions of the instrument powerful appliances of machinery have been required; but in latter days mechanical engineers have been able so to combine and counterpoise great masses of cast iron machinery, as to effect with wonderful ease every delicate movement desired by the astronomer, and now the idea of mounting even these large telescopes equatorially is growing familiar. The application of clockwork movement to such large reflectors renders it practicable to use them for celestial photography, as well as for some of those extremely delicate astronomical measurements which the science is now demanding for the resolution of sundry long vexed problems.—The application of the telescope to meridian instruments is exemplified in the article TRANSIT CIRCLE; but the telescope is also universally used for differential measurements. When applied to this class of observations, various modifications or appliances have been from time to time suggested or practised. The filar micrometer is the most common auxiliary of the telescope, and in skilful hands is capable of astonishing accuracy. Great use has also been made of the power of producing and comparing together double images of the objects to be measured. These double images are produced in various ways. Savery in England in 1743, and Bouguer in France some 4 years later, proposed, independently of each other, to measure the diameter of the sun by using two object glasses in the same telescope and with the same eye piece. In Savery's plan, the glasses were all fixed so as to give two images of the sun whose outer edges were nearly in contact; and by measuring the variable distance of these edges, he obtained the corresponding variations of the semi-diameter from perigee to apogee. Bouguer's invention was more generally applicable, for he made one of his object glasses movable, and thus could measure any angle from zero to his maximum limit, which was probably somewhat greater than the sun's diameter. In 1753 John Dollond invented the divided-object-glass micrometer, which has in later years, under the technical name of heliometer, achieved such wonders in the hands of Bessel and his followers. In this instrument the object glass itself when finished is divided into two equal segments, each of which forms its image independently of the other. When the semi-lenses are brought to their normal position of coincidence, the two images coincide also; but when separated, the images diverge, and the angle of divergence is measured by the amount of separation of the lenses. Thus the apparent diameter of a planet, for instance, is obtained by separating the images until their outer edges are in exact contact, and this may be more accurately perceived than the coincidence of the edge with a fine thread placed tangent to it as in the filar micrometer. Dollond proposed moreover to gain both accuracy and convenience of use by placing a divided object glass of very long focus before the speculum of a reflecting telescope, which would give a larger scale for the measurement of a given angle than would belong to a simple telescope of the same length. Fraunhofer was at the time of his death engaged in devising a heliometer which, when afterward completed, was placed at Königsberg. Bessel, whose "Theory of the Heliometer" is one of the most elaborate and beautiful monographs of astronomy, was able with this instrument to grapple successfully with that even now most difficult practical problem, the measurement of the parallax of a fixed star. Several attempts have also been made, as by Rochon, Maskelyne, and Boscovich, to produce the double images by refraction through prisms or pairs of prisms, either beyond the object glass, or sliding within the tube, as well as by dividing the small mirror of reflecting telescopes, as Ramsden suggested for the Cassegrainian form, and Brewster for the Newtonian. Divided-eye-lens micrometers have also been made, the best form of which is that given by Airy, who found the four-glass eye piece best adapted for this purpose, and divided the second lens, counting from the object glass. There is, however, in all the arrangements of divided lenses, an essential imperfection arising from the exhibition of color and of some diffraction in the direction at right angles to that of the line of separation, and this practical inconvenience may be seriously felt in some classes of observations. On this account, it will probably yet be found most advantageous to make use of the double refracting property of certain crystals for the separation of images.

TELFAIR, a S. co. of Georgia, bounded S. and W. by the Ocmulgee and N. E. by the Little Ocmulgee river; area, 925 sq. m.; pop. in 1860, 2,718, of whom 836 were slaves. The surface is level and the soil sandy, with extensive pine forests. The productions in 1850 were 77,085 bushels of Indian corn, 44,250 of sweet potatoes, and 572 bales of cotton. There were 14 churches, and 248 pupils attending public schools. Capital, Jacksonville.

TELFORD, Thomas, a Scottish civil engineer, born in Westerkirk, Eskdale, Dumfriesshire, Aug. 9, 1757, died in Westminster, Sept. 2, 1834. At the age of 14 he was apprenticed to a stone mason, and in 1780 went to Edinburgh, and while there in all his intervals of leisure studied architecture and drawing. Two years later he removed to London, and was employed by Sir William Chambers on the quadrangle of Somerset house, then building. He was afterward employed for 3 years as architect in the Portsmouth dockyard, then upon the alterations of Shrewsbury castle, and in the construction of numerous bridges, one of which over the Severn had a flat arch of 130 feet span. He superintended the construction of the Ellesmere canal, 103 miles in length, and requiring several extensive aqueducts over the valleys, which he built for the first time of iron; the Caledonian ship canal, whose locks surpassed any previously built in size; and 6 other canals of considerable extent in England and Scotland, the Gōtha canal in Sweden, an immense tunnel at Harecastle on the Grand Trunk canal, and the works executed under the commissioners of highland roads and bridges, which included the construction of 1,000 miles of new road and 1,200 bridges, and the improvement of several harbors. The St. Katherine docks of London, the improvement of the Aberdeen and Dundee harbors, the construction of iron bridges with flat arches of 170 feet span, and above all the great Menai suspension bridge, were among his subsequent engineering triumphs. He was elected a member of the royal society of Edinburgh in 1803, and of that of London in 1827. He was president of the institution of civil engineers from 1820 till his death, and bequeathed to it £2,000 for a premium fund, together with all his scientific books, prints, and drawings. Beside the account of his labors on public works, which, with additions made by his executors after his death, constituted a biography, and was published under the title of "Life of Thomas Telford, Civil Engineer, writtten by Himself" (4to., with a folio volume of plates, 1838), Mr. Telford in early life published some poems under the signature of "Eskdale Tom."

TELL, William, the legendary hero of the Swiss revolution, born at Bürglen, canton of Uri, in the latter part of the 13th century, died in 1354. The holder of a farm belonging to the abbey of Fraumünster in Zürich, he married the daughter of Walter Fürst of Uri, and joined the patriots, who, meeting on the Rütli under the leadership of his father-in-law, of Werner Stauffacher of Schwytz, and Arnold von Melchthal of Unterwalden, Nov. 7, 1307, swore to overthrow the tyranny of the Austrian bailiffs. Passing one day with his son through the market place at Altorf, where Hermann Gessler, the bailiff of Küssnacht, had caused a pole to be erected with the ducal hat of Austria on its top, he, notwithstanding orders to that effect, declined uncovering his head as a token of submission. For this offence he was arrested and brought before Gessler, who threatened him with death. On second thought, the bailiff, who had heard that Tell was the most skilful bowman among his countrymen, told him that he could redeem his life by shooting an apple from his own child's head. Vainly did he beg the tyrant to be relieved from so dreadful a trial; he was compelled to obey. Gathering all his energy and invoking the Almighty, he succeeded; and in the fulness of his joy was embracing his son, when an arrow was discovered which he had concealed in his bosom. "What was it for?" asked the bailiff. "To kill you if I had hurt my boy," was the answer. He was immediately chained by order of the bailiff, who, taking him in his own boat, intended to have him incarcerated in the castle of Küssnacht; but during the sail across the N. bay of the lake of Lucerne, a storm arose which put the craft in imminent danger. Tell was a good boatman; by order of Gessler he was unfettered, grasped the rudder, and soon brought the boat safely near to the land; but now, seizing a favorable opportunity, he sprang upon a projecting headland, which is still known as "Tell's Rock," or "Tell's Leap," while he pushed back the boat into the surf. Then he hid himself in a ravine through which his enemy had to pass on his way to Küssnacht, and mortally wounded him with an arrow. This event is said to have hastened the breaking out of the Swiss revolution, in which he actively participated; and he fought at the battle of Morgarten in 1315. He had reached a good old age, when, in attempting to save a boy's life, he was drowned in the Schächen. The dramatical part of this story has been questioned by modern critics; it is not narrated nor even alluded to by contemporary chroniclers, and is first found in writers of the 15th century; moreover, the name of Gessler does not figure on the records of the Austrian bailiffs. It has been remarked also that a tale to the same import was current in the ancient annals of Denmark, as appears in the *Historia Daniæ* of Saxo Grammaticus. (See Hisely's *Récherches critiques sur l'histoire de Guillaume Tell*, Lausanne, 1843.) Whatever the truth may be, Tell's memory is still bright in his native country; and Johannes von Müller, in his history of Switzerland, regards him as a historical character.

TELL-TALE. See TATTLER.

TELLURIUM (Lat. *tellus*, the earth), an elementary substance, discovered and named by Klaproth in 1798; symbol, Te; chemical equivalent, 64.5; specific gravity, 6.65; hardness, 2–2.5. Though commonly classed among the metals, it has much analogy in its properties to sulphur and selenium. It occurs in a native state associated with iron pyrites and various metals, as gold, silver, bismuth, copper, or lead. The native metal is of a brilliant metallic lustre, of a tin-gray or lead-gray color, passing to steel-gray. It is very fusible before the blowpipe, and burns with a bluish flame, green on the edges; it volatilizes in white fumes, leaving no residue; and it is wholly soluble in nitric acid. The substance occurs in small masses, irregularly lamellar, and crystallized in 6-sided prisms, at the mine of Maria Loretto near Zalathna in Transylvania. Tellurium is almost always combined with small portions of iron or gold in a metallic state, silver, or lead, so that some have supposed that the substance ought to be considered as a telluret of iron or of gold. Many natural alloys have been met with at the mines of Hungary and Transylvania, and from the collection of those presented by the emperor of Austria to the museum of natural history at Paris, Dufrénoy has arranged the varieties among the following 5 species: native tellurium, auro-argentiferous tellurium (graphic gold), auro-plumbiferous tellurium (mullerite), plumbo-auriferous tellurium (nagyagite), and telluric bismuth (bornite). Auro-argentiferous tellurium was recognized at the Gold Hill mines, North Carolina, by Dr. Genth, and telluric bismuth is found in many of the gold mines of Virginia and North Corolina, in foliated scales and lamellar masses. Tellurium combines with oxygen to form two compounds of feeble acid characters, TeO_2 and TeO_3, corresponding in composition with sulphurous and sulphuric acid. With hydrogen it forms the gaseous compound TeH, analogous to sulphuretted hydrogen.

TELLUS. See TERRA.

TEMESVÁR (anc. *Thybiscus*), a town of Hungary, capital of the county of Temes, and formerly of the Banat, situated on the Bega canal, 75 m. N. N. E. from Belgrade; pop. in 1854, 20,300. It stands in an extensive marshy plain, is defended by walls and outworks, and entered by 3 gates. Iron wire, silk, cotton cloth, paper, and leather are manufactured. The Bega canal connects it with the Danube, and a railroad with Szegedin and Pesth. Temesvár is the see of both a Greek and a Roman Catholic bishop, and the seat of several law courts. It was captured after a heroic defence and sacked by the Turks in 1552, and held till 1716, when it was taken from them by Prince Eugene, and rebuilt and strongly fortified. It was besieged for about 100 days by the Hungarian revolutionary army in 1849, and was relieved by Gen. Haynau, who near its walls achieved the most important Austrian victory in that war (Aug. 9, 1849); but it suffered severely from the bombardment, as well as from fever and cholera.

TEMPE, a valley of Greece, in the north of Thessaly, celebrated in antiquity for its beauty. It is a glen between Mts. Olympus and Ossa, through which the Peneus flows into the sea. Poets and rhetoricians often mentioned it as a type of sylvan loveliness, and it was also famed as a haunt of Apollo. It was with laurel from Tempe that the victors in the Pythian games were crowned. Only some of the later classical authors seem to have described it from observation, and to have been aware of its savage grandeur, the lofty cliffs rising almost perpendicularly on either side, and the Peneus rushing through the middle of the valley. The defile is about 5 m. in length, and is so narrow in parts as to afford space only for the river and the road. It is the only channel through which the waters of the Thessalian plain reach the sea, and was believed to have been formed by some convulsion of nature, by Hercules, or by Neptune, as an outlet for what had previously been a vast inland sea. It was also one of the few passes through which an army from the north could invade Thessaly, and was therefore of great military importance. Four carefully constructed fortresses added to its natural impregnability.

TEMPERAMENT, a term used by physiologists to express the differences in the physical and mental constitutions of individuals, referred from remote antiquity to peculiarities in the quality of the solids and fluids of the body. These peculiarities cannot be accurately estimated and defined, nor be demonstrated by the anatomist and chemist, and are detected and appreciated chiefly by the character which they impress upon the thoughts and actions, always within the limits of health. The ancients believed that the fluids of the body consisted of 4 humors (corresponding to the 4 then so called elements, earth, air, fire, and water), which they named bile, blood, black bile (supposed to come from the spleen), and phlegm or watery fluid (believed to come from the brain); and, if either of these elements was in excess, that it gave rise in the above order to the bilious or choleric, sanguine, melancholic, and phlegmatic temperaments. This view prevails in the popular mind to the present day, and was maintained by physicians to the time of Cullen, who admitted only 2 temperaments, the sanguine and the melancholic, regarding the phlegmatic as a degree of the former and the choleric of the latter. Of course, there is an endless variety in the shades of temperament in different individuals, but the characters of the 2 temperaments of Cullen are as follows: The sanguine temperament is marked by a predominance of the circulatory system, with a strong and frequent pulse, firm flesh, plump figure, smooth and fair skin, ruddy complexion, soft and light hair, and light eyes; there is great nervous susceptibility, ready memory, lively imagination, cheerfulness, and a love for sensual pleasures; its diseases are generally violent and inflammatory. The English as a race are good examples of this temperament; its physical traits may be seen in the Apollo Belvedere, Venus de' Medici, Antinoüs, and the "Greek Slave," and its moral traits in the lives of Alcibiades, Washington, Mark Antony, Lady Jane Grey, John Adams, and Winfield Scott; and both are represented in the god Bacchus and in the celebrated duke of Richelieu. A variety of this is the muscular or athletic temperament, in which with all the external signs of strength the intellect is poorly developed; the Farnese Hercules is a good embodiment of this temperament. In Cullen's melancholic temperament, which later physiologists consider as secondary or morbid, the solids predominate, the figure being less plump and more firm, the hair and eyes black, the skin coarse and dark, the countenance sallow and sad; the vital functions are slowly performed, but the strength is considerable; the disposition is gloomy and the temper suspicious; the manner is slow, grave, cautious, impassive, but tenacious of all emotions when once excited. Don Quixote is a good representative of this temperament; also Louis XI., Tasso, Pascal, Zimmermann, and J. J. Rousseau. Other temperaments as well characterized as the above are the bilious, lymphatic, and nervous. The bilious or choleric temperament is marked by a supposed predominance of the biliary system, with strong hard pulse, yellowish brown skin and dark hair, and moderately fleshy body; by violent and easily excited passions, firmness and inflexibility of character, boldness, and perseverance. The greatest virtues and the greatest crimes are met with in persons of this temperament; here are generally placed (though in some instances erroneously, as will be seen below) Alexander the Great, Julius Cæsar, Brutus, Mohammed, Charles XII., Peter the Great, Cromwell, Cardinal Richelieu, Attila, Charlemagne, Tamerlane, Richard III., and Napoleon I. The moral faculties are early developed. It is difficult to draw the line between this and the sanguine temperament. In the phlegmatic or lymphatic temperament, the proportion of the fluids is supposed to be too great, from activity of the secreting system and inactivity of the absorbents; the flesh is soft, the skin pale and flabby, hair light, pulse weak, and the figure rounded, with little expression of countenance or activity of mind and body. Here have generally been placed Charles IV. of Spain, Augustus III. of Saxony, and Ferdinand I. of Sicily. The prominent character of the nervous temperament is a great excitability of the nervous system, and the preponderance of the emotions and impulses over the reason and will; the muscles are small and soft, and the form generally slender. Here belong fidgety and restless people, the so called creatures of impulse, and erratic men of genius; Voltaire and Frederic the Great are good examples of it. It can hardly be said to exist independently, and generally accompanies the sanguine temperament, being best and most frequently seen in the female sex; it is often the consequence of sedentary life and of sensual indulgence and excitement; its diseases are generally hysterical and convulsive.—According to Dr. R. B. Todd, the quantity of pigment or coloring matter in the body is intimately associated with the temperaments; individuals and races of tropical and warm regions, with dark hair, eyes, and skin, belong as a rule to the melancholic temperament; while those of cold and temperate zones, with light hair and eyes and fair complexion, belong to the sanguine. Whatever physical conditions produce color and its concomitants determine also the nature of the temperament; these conditions act also to a certain extent on the mind, aiding or impeding its workings. There can be no doubt that the mind has its temperaments independent of those of the body, according as the emotions or the reasoning will vary in their natural intensity, educational development, or manner of working. The temperaments are intimately related to individual constitutions, idiosyncrasies, acquired differences, and varieties in the human race; they are more or less combined together, and by external circumstances are convertible into each other; indeed, the whole subject is so indefinite that some physiologists consider the above doctrine of the temperaments as a mere superstition connected with the old humoral pathology, and regard the mental and moral influences formerly attributed to the organic peculiarities upon which these temperaments were founded as pertaining to differences of cerebral organization.—The most recent and plausible classification of the temperaments is that originated by Dr. William Byrd Powell, and defined and illustrated in his "Journal of Human Science" (Cincinnati, O., 1860). He makes only two vital, primary, or original temperaments, the sanguine and the bilious, the latter even being only a modification of the sanguine from climatic or other external influenees; to these he adds the lymphatic and encephalic (instead of the melancholic), secondary or acquired, but by transmission now become as elementary as the other two, to one or the other of which they are always adjuncts. He makes 10 compound temperaments, divided into binary, ternary, and quaternary. With the study of the temperaments, to which he has devoted nearly 40 years of his life, he has connected the very important subject of incompatible marriages; he lays it down as a physiological law that there is a sexual incompatibility in the marriage of persons who have the same or nearly allied temperaments (as he defines them), and that the children from such a union, if there be any, will die early or linger out a miserable existence. All kinds of physical degeneracy, deformity, scrofulous and cerebral diseases, he refers, and with great apparent justice, to the reduced vitality resulting from incompatible or unphysiological marriages; the union of blood relations may be fraught with the direst consequences, not because of the blood relationship, but from the greater probability that consanguine marriages will bring together persons of incompatible temperaments; cousins will, as surely as strangers, have healthy children, provided their temperaments are compatible. Marriage in contravention to the physiological conditions known as temperaments he names physiological incest, whether with blood relations or not. The law is briefly this: one of the parties must possess exclusively a vital temperament, and the other a more or less non-vital one; and all marriages in opposition to this law are more or less incestuous; in other words, physiological incest arises from physiological and not personal or external similitude. 1. His sanguine temperament does not differ essentially from that described above; he places in it, with various adjuncts, beside Washington and Gen. Scott, Alexander the Great, Cæsar, Napoleon I., Cornwallis, and Edward Everett (the last, however, with a decided encephalic adjunct). 2. In the bilious temperament the outlines of the person are angular, and the muscular movements are supple; the complexion is not necessarily dark, any more than it is of necessity florid in the sanguine; its members are apt to be impatient and impetuous; among them he places Gustavus Adolphus of Sweden, Mohammed, Dante, Pizarro, Wellington, Jefferson, and Andrew Jackson. 3. In the lymphatic temperament the head is of good size, without angularity; the person is rather shapeless, the flesh soft, the lips thick, the cheeks heavy, and the expression when at rest listless; it is compatible with excellent judgment and exalted patriotism, and is by no means necessarily the disgusting sac of humors generally represented by physiologists. This temperament is usually the result of the ease and indulgence arising from wealth, and is greatly favored by a moist atmosphere, as in China, Holland, and the deltas of the Nile and the Mississippi; it is well illustrated by the Chinese mandarins, and in the works of Rubens. The Esquimaux are bilious, not lymphatic, as often described; fat must not be confounded with lymph, the latter pervading the whole system; obesity blunts every capacity, sometimes reducing man almost to the condition of a hibernating animal, while a decidedly lymphatic person may display high mental endowments. 4. In the encephalic temperament (probably what the ancients meant by the melancholic) the cerebrum is relatively large and the cerebellum small; the person is contracted, the limbs slender, neck long, chest narrow, and abdomen flat; the face is thin, and the forehead massive and especially expanded in the upper third; the expression is severe, thoughtful, and often gloomy; the vital powers are slowly developed, and yet it is compatible with health and longevity; persons of this class are capable of profound investigation, but are very subject to monomania; of this Pascal is an example. The last two temperaments are the results of civilization, and are not found among savage races; none of the 4 mentioned are found pure and single, or very rarely, but almost always in combination. 5. In the union of the sanguine and the bilious the hair, eyes, and complexion are light or dark according to the preponderance of each element; the head is compact, and the muscles firm and strong; Alfred the Great of England is a good example of this temperament. 6. In the sanguine-lymphatic the head is round, the face broad, the person full, and the complexion fair; the females are often beautiful, their complexion being a mixture of the lily and the rose; it is an unfavorable combination, and few who have it become celebrated for any thing good; it entails the tendency to crime, especially assassination and rowdyism; the emperor Nero may be taken as an example of it. 7. In the sanguine-encephalic the head is narrow and the forehead elevated, the skin, &c., light, the person slight, and the muscles feeble; its members are amiable, but too gentle for the rugged pursuits of life; they are generally found in the counting room and in stores, and in employments better fitted for females; some artists have been of this temperament, of which Benjamin West is an instance. 8. In the bilious-lymphatic the head is rounded, the hair, &c., dark, and the face and person full; the females are often very handsome. Persons of this temperament are good-natured, not ambitious, but useful for the soundness of their judgment. 9. The bilious encephalic is like the sanguine encephalic, except that the hair, &c., is dark; illustrations are Columbus, Shakespeare, Lord Bacon, Dr. Johnson, Pope, and Prescott the historian. 10. The first of the ternary compounds is the sanguine-bilious-lymphatic, like the sanguine-bilious, but with less plump person, thicker lips, and forehead broad below, contracting rapidly as it rises; the nose has generally a small protuberance at the end. It may possess much muscular strength and activity, many of the English prize fighters having belonged to it, and it forms a large element in mobs and riotous assemblages, whether in a good or bad cause. In this have been placed Peter the Great, C. J. Fox, Leo X., George IV. of England, Stephen Girard, Baron Larrey, and Henry Ward Beecher. 11. In the sanguine-bilious-encephalic the head is above the average size, and generally rather angular with the upper forehead expanded; it has less muscular energy than the last; many artists are of this temperament; Melanchthon belonged to it, as does Gov. Banks of Massachusetts, the latter with a bilious predominance. 12. In the sanguine-encephalic-lymphatic the head is large, with elevated and expanded forehead; it has great literary capacity, but is little adapted for the sharp conflicts of life; Addison, Swift, Walter Scott, Lewis Cass, and the late Chief Justice Shaw are examples of it. 13. In the bilious-encephalic-lymphatic the head is large, with expanded forehead, dark complexion and eyes, and full person; it is adapted for high position in any sphere of life; examples of it are Daniel Webster, the emperor Nicholas of Russia, John Bunyan, Gibbon, Prof. Agassiz, and Washington Irving. 14. The quaternary, and most gifted of all the temperaments, is the sanguine-encephalic-bilious-lymphatic; the sanguine element gives vitality, the bilious activity, the encephalic intellectual energy, and the lymphatic prevents morbid irritability; the head is large, the complexion dark, the forehead high, and the person full and round; here most probably belong Julius Cæsar, Napoleon I., Cromwell, Daniel O'Connell, and Stephen A. Douglas; it is a combination of the forces of all the elementary temperaments. All of the above temperaments are incompatible with themselves, but 1, 2, and 5 are the least so; these 3 are compatible with all the others, and one of the parties, to insure healthy progeny, should be of them or exclusively vital.

TEMPERANCE SOCIETIES. See Abstinence, Total.

TEMPERATURE. See Climate.

TEMPLARS, or Knights of the Temple, the most celebrated and powerful of the religious military orders of Christendom. Its origin is ascribed to Hugues de Payens, Geoffroi de St. Omer, and 7 other French knights, who in 1118 or 1119, in addition to the 3 vows of chastity, poverty, and obedience, took a 4th, by which they bound themselves to defend the holy sepulchre of Christ and to afford protection to the numerous pilgrims who then annually flocked to the Holy Land. The military character associated with the new order attracted immediate attention, and after its formal incorporation by Pope Honorius II. in 1128 at the instigation of St. Bernard, its numbers rapidly increased, members of the noblest families of Europe seeking admission into its ranks, and people of every degree vying with each other in endowing it with gifts of land or money. In 1128 the templars also received from Honorius a peculiar dress consisting of a white mantle, to distinguish them from the hospitallers, who were habited in black; and in 1146 they added a red cross on the left breast. This emblem was also borne on their banner, formed of striped black and white cloth, and called *béaucéant*, a word rendered famous throughout Christendom as the battle cry of the order. Soon after their establishment Baldwin II., king of Jerusalem, gave them a part of his palace as a residence, to which the canons of the adjoining convent of the temple added another building for keeping their arms, whence they were called knights of the temple. After the order had acquired power and possessions throughout Europe and the East, it came under the control of a complex form of government, consisting of a grand master or head of the order, elected by the chapter or general body of the knights, and who had under him a seneschal and other high officers; provincial masters, who presided over the several countries or provinces in which the templars had possessions; priors or masters, who had charge of the districts into which a province was divided; and preceptors or superintendents of the single houses of the order in the districts. The province in which the grand master resided, and which for upward of 173 years from the foundation of the order continued to be in Palestine, was always considered the chief seat of the order, and its chapter had the powers of a general chapter when that body was not in session. Of the 9,000 lordships and estates which the order possessed in the middle of the 13th century, the chief part were in France, and to that country generally belonged the grand master, who in some respects assumed the dignity of a sovereign prince. For more than 40 years after their organization the templars comprehended only laymen; but by a bull of 1172 Pope Alexander III. allowed the order to receive spiritual members, who celebrated mass and other religious offices in its houses, acted as secretaries to the chapter, or filled the office of preceptor. Somewhat later persons not of noble birth or knightly rank were admitted as servitors or serving brethren, of whom there were two classes, those who attended the knights in the field in the capacity of squires, and those who exercised various handicrafts in the preceptories, the former being held in the greater estimation. There were also affiliated members, who took none of the vows and assumed none of the duties of the order, but sought even a qualified admission into its ranks for the security thereby afforded; and lastly children dedicated by their parents to the order, and hence called *donati*, and persons who under the name of *oblati* pledged themselves to maintain its rights. Among other important advantages conferred upon the templars was that of having the offices of religion performed in their houses once a year, even in countries under an interdict, whence in practice they became exempt from the effects of an interdict, a circumstance which added greatly to their influence and numbers. They became in time a formidable and wealthy military community, the members of which, animated by the closest corporate spirit and subjected to the severest internal discipline, had no property or interest distinct from the order in general, acknowledged no spiritual authority but the pope, and held themselves amenable to him only in secular matters. Originally subsisting upon the alms of the charitable and making a show of poverty, as illustrated by their seal, which represented two knights riding upon a single horse, they increased so rapidly in wealth as to become more interested in extending and guarding their possessions than in affording protection to pilgrims; and notwithstanding their unquestioned prowess and daring, their frequent feuds with the rival order of the hospitallers, and their open licentiousness and lust of gain, often injured rather than aided the cause to which they had devoted themselves. Hence they fought more for themselves than for the common cause of Christianity, aided or thwarted the plans of campaigns at their pleasure, and frequently stained their knightly name and fame by open treachery, as in the 6th crusade under the emperor Frederic II., the partial failure of which was attributed to the machinations of the templars. So far had they departed from the motives and principles of the founders of the order, that during the gradual decline of the Christian kingdom in Palestine they endeavored by separate treaties with the Saracens to secure their own possessions in that country. After having their chief seat successively in Jerusalem (1118–'87), Antioch (1187–'91), Acre (1191–1217), and the Pilgrim's Castle near Cæsarea (1217–'91), they were nevertheless compelled at the final extinction of the Latin power in Palestine in 1291 to remove to the island of Cyprus, which they had purchased from Richard I. of England for 35,000 silver marks. Though driven out of the Holy Land, the organization evinced no signs of decay, and its extensive ramification throughout Europe drew upon it the suspicion and jealousy of princes, whose cupidity was also excited by its immense wealth in landed revenues and hoarded coin. Under the influence of these motives, and irritated by his inability to tax the order, Philip the Fair of France, in concert with Pope Clement V., determined upon its destruction. Accordingly, in 1306 Jacques de Molay, the grand master of the templars, was enticed to Paris, on a pretext of consulting him with reference to a new crusade and other matters; and on Oct. 13, 1307, all the members of the order in France, including De Molay himself, were taken into custody, and their houses and goods were everywhere seized. The formal charges on which they were arrested, and which were preferred by two degraded templars, imputed to them grave heresies connected with their secret rites of initiation and internal discipline, and graver violations of morality. How far the influence of oriental manners and superstitions may have affected the belief or habits of the order during their long residence in Palestine, it is difficult to determine; but although it is not improbable that they had borrowed to some extent from the Gnostic rites and magical practices of the eastern races with whom they had come in contact, there is no evidence beyond their own confessions, wrung from them by torture, to substantiate the charges of their accusers. Under these circumstances the pope hesitated to promulgate the decree for the extinction of the order; but the less scrupulous Philip, finding his colleague loath to imitate his own intemperate zeal, procured one of his creatures, the archbishop of Sens, whose jurisdiction extended over Paris, to convoke his provincial council in that city on May 10, 1310; and on the 18th of the month, by command of that body, 54 members of the order were burned at the stake in a field behind the abbey of St. Antoine. The example was imitated elsewhere, and on May 2, 1312, Clement on his own responsibility, the general council of Vienne then in session being averse to precipitate measures, issued a bull for the abolition of the templars. Their movable property was for the most part appropriated by the sovereigns of the countries in which it was deposited; and although their landed possessions were nominally transferred to the hospitallers, the crown as a general thing secured the disposition of them. The order ceased at once throughout Christendom except in Portugal, where it merely assumed the name of the chevaliers of Christ, which order still subsists. The last act of the drama was the execution at the stake of De Molay, Guy of Auvergne, and other high dignitaries of the order, of whom the two first named died protesting their innocence, having previously recanted the confessions extorted from them by hopes of absolution or by torture.

TEMPLE, RICHARD GRENVILLE, earl, an English statesman, born in 1711, died in 1777. He was the eldest son of Richard Grenville and Hester Temple, and in 1752 succeeded his mother, who had in 1749 been created Countess Temple, as Earl Temple. The marriage of his sister Hester Grenville with William Pitt, afterward earl of Chatham, was the means of introducing him to public life, and during the first Pitt administration he was a prominent member of the cabinet. According to Macaulay, he was not remarkable for administrative talents, but was a skilful parliamentary tactician. In 1852–'3 appeared "The Grenville Papers" (4 vols. 8vo.), comprising the correspondence of Earl Temple and his brother George Grenville between 1742 and 1777, edited by W. J. Smith from the original papers deposited at Stowe, the chief seat of the family. They throw much light upon the political movements of the period which they cover, and are asserted by the editor to afford evidence of the identity of Earl Temple with Junius. The present representative of the Grenvilles is the duke of Buckingham and Chandos.

TEMPLE, SIR WILLIAM, an English statesman and author, born in London in 1628, died at Moor Park, Surrey, Jan. 27, 1699. He was the son of Sir John Temple, master of the rolls in Ireland. He passed two years at Emmanuel college, Cambridge, went abroad without taking a degree, and after a somewhat extended continental tour, in the course of which he acquired a mastery of the French and Spanish languages, he returned to England, was married in 1654, and for several years resided with his father in Ireland. In 1660 he was chosen a member of the Irish convention for the county of Carlow, and also represented that constituency in the first Irish parliament convoked after the restoration. In 1663 he repaired to England with his family, carrying letters of recommendation from the duke of Ormond to Lord Arlington, one of the secretaries of state, and in 1665 was sent by that minister on a secret mission to the bishop of Münster, who had stipulated, in consideration of the payment by the English government of a large subsidy, to make a land attack upon the Dutch, who were then at war with England. Although the bishop deserted his allies and made a separate treaty with the Dutch, Temple's diplomatic services were so highly esteemed by Charles II. that he was created a baronet and appointed resident at Brussels. In the autumn of 1667, soon after the conclusion of peace with Holland, Temple made a visit incognito to that country, and, in view of the dangerous encroachments of France upon the Spanish Netherlands, urged upon his government the necessity of an offensive and defensive league with Holland against the projects of Louis XIV. Receiving, in Jan. 1668, the necessary powers to negotiate such a treaty, he concluded in the same month the celebrated triple alliance between England, Holland, and Sweden, by which the contracting parties bound themselves to endeavor to bring about a peace between France and Spain, and to keep the former power out of the Low Countries. This measure, characterized by Macaulay as "the single eminently good act performed by the government during the interval between the restoration and the revolution," gave Temple at once a European reputation, and is considered the master stroke of his political career. After perfecting at Aix la Chapelle negotiations for peace in pursuance of the triple alliance, he repaired in Aug. 1668, in the capacity of ambassador, to the Hague, where he cultivated a warm friendship with the grand pensionary De Witt and the young prince of Orange. Recalled to England in Sept. 1670, he discovered that the ministry had treacherously formed a secret treaty with France, by which the triple alliance was rendered of no effect, and in June, 1671, received his dismissal from office. For two or three years he resided at his estate of Sheen; but in 1674 he was summoned from his retirement to negotiate a peace with Holland, which he accomplished in London in the space of 3 days. He returned soon afterward to his former position at the Hague, and was also one of the mediators deputed to attend the congress of Nimeguen, which after tedious negotiations resulted, in the latter part of 1678, in a hollow and unsatisfactory treaty of peace between France and Holland, to which Temple declined to affix his signature. In the interval he contributed largely to bring about the marriage of the prince of Orange with Lady Mary, daughter of the duke of York. Returning to England in 1679, he was solicited by the king to accept the office of secretary of state, which had indeed been offered to him before; but feeling, to use his own words, that "the scene was unfit for such an actor as he knew himself to be," he excused himself on the score of not having a seat in parliament. The king, harassed by the violence of parliament, gladly availed himself of the advice of Temple, whose plan for a new privy council of 30 members, 15 to be great officers of state and 15 independent noblemen and gentlemen of great weight and landed possessions, was in April, 1679, carried into effect, to the great satisfaction of the public. Almost immediately afterward one of the fundamental principles on which it had been constructed, the prohibition of a secret interior council or cabinet, was violated; Lord Shaftesbury was admitted a member against the remonstrance of Temple; and in general the objects of the projector were so perverted, that he gradually ceased to attend the regular meetings. A single session of parliament, to which he had been elected from the university of Cambridge, sufficed to satisfy him with legislative life; and upon his name being stricken by the king from the list of privy councillors, he gladly retired in 1680 to his gardening and library at Sheen. Thenceforth he lived in retirement, either at Sheen or at Moor Park, a seat in Surrey, engaged in the completion of his memoirs, and enjoying the confidence and friendship of William III., who vainly urged him in 1688 to accept the secretaryship of state, and who frequently visited him for advice in public matters. During the last 10 years of his life he was attended in the capacity of secretary by Jonathan Swift. His works, comprising "Observations upon the United Provinces of the Netherlands," essays on the "Origin and Nature of Government," "Ancient and Modern Learning," "Gardening," &c., and a variety of political and miscellaneous tracts, contain many acute observations, expressed in so easy a style that he is called by Johnson "the first writer who gave cadence to English prose." Sir James Mackintosh calls him "the model of a negotiator;" but according to Macaulay "he was merely a man of lively parts and quick observation; a man of the world among men of letters; a man of letters among men of the world." As a fine gentleman he was one of the most distinguished of the age. His collected works were first published in 1720; the last and best edition is in 4 vols. 8vo. (London, 1814).

TENANT. See LEASE, and TENURE.

TENASSERIM PROVINCES, a tract of land in British India beyond the Ganges, attached to the government of Penang, under the Bengal presidency, extending about 500 m. along the E. side of the bay of Bengal, with a breadth of from 40 to 80 m., between lat. 11° and 19° N. and long. 97° 30′ and 99° E., bounded N. by the native state of Laos, E. and S. by Siam and the Malay peninsula, and W. by the bay of Bengal, gulf of Martaban, and Pegu, from the last of which it is separated by the river Salwin; area, 30,000 sq. m.; pop. estimated at 200,000. The country is divided into the provinces of Amherst, Tavoy, Ye, and Mergui; and the chief towns are Amherst, the capital, Maulmain, Martaban, Tavoy, Mergui, and Tenasserim. The sea coast S. of lat. 11° 40′ is bold and rocky, while to the N.

it is flat and much more indented with bays, creeks, and the estuaries of rivers and streams. Along its whole extent are situated islands which appear from seaward to form part of the shore. Those lying between lat. 8° and 14° 40′ N. are known collectively under the name of the Mergui archipelago, and extend from 30 to 80 m. from the shore. The principal islands of this group, from S. to N., are Sullivan island, Kisseraing, Domel, Kalegouk or Bentinck, Ross, King's, and Tavoy. The most important island on the coast, however, is Balugyun, opposite the town of Maulmain, 17 m. long and 8 broad.—The whole territory of Tenasserim, particularly toward the N., is intersected by numerous rivers, the principal being the Salwin, Atta-Yen, Tavoy, and Tenasserim. The E. boundary is formed by a range of wooded mountains varying in height from 3,000 to 4,000 feet above the sea. In the N. there is a separate range, about 2,000 feet high, covered with bamboo jungles. There are extensive plains and fertile valleys lying upon the banks of the rivers toward the N. The staple productions are rice, cotton, sugar cane, indigo, and tobacco; and wheat, nutmegs, different spices, and dye stuffs are raised. Nearly 880 different varieties of timber have been enumerated. Iron ore is very abundant, and exceedingly rich. Tin, gold, copper, bismuth, antimony, and manganese are also found. Coal of good quality has been discovered in several places. The climate is considered remarkably healthy, the rate of mortality among Europeans being little more than it is in Europe in like circumstances. The thermometer never rises above 90°, the average being 77°. The rainy season begins in the S. part of the territory about the 1st of May, and at Maulmain a month later; the fall is much the greater toward the N., where it is estimated at 200 inches in a year.—The population comprises Burmese, Peguans, Siamese, Karens, Seelongs, Hindoos from the Coromandel coast, half caste Portuguese, Chinese, a few American missionaries, and the English officials and traders. The Burmese and Peguans are the most numerous; and the Siamese are principally settled in the neighborhood of the Tenasserim river. The chief manufactures are cotton and silk goods, coarse pottery, and iron cooking vessels. Ship building is largely carried on at Maulmain, and to a less extent at Mergui and Tavoy. The chief exports consist of rice, tobacco, gambier, ivory, edible birds' nests, and teak timber.—The Portuguese visited the territory which forms the Tenasserim provinces early in the 17th century; and in 1687 some English were massacred at Mergui, the country being then a dependency of Pegu. It afterward became subject to Siam, from which power it was taken about the middle of the last century by the Burmese, who held it till it was annexed to British India at the termination of the Burmese war in 1826. From the long unsettled state of the country, the entire population of the 4 provinces at that time only amounted to about 30,000; but since security for life and property has been established population has rapidly flowed in from the surrounding states.

TENCH, a soft-rayed, fresh water fish of the carp family, and genus *tinca* (Cuv.), peculiar to the old world. The best known species is the *T. vulgaris* (Cuv.), rarely more than 14 inches long, of a deep yellowish brown color, and sometimes golden and greenish; the dorsal and anal fins have no osseous rays, and the former is inserted behind the commencement of the ventrals; the teeth on the pharynx are compressed and club-shaped; scales very minute, covered with mucus; a very small labial barbel at each side of mouth; the body thick and broad, and the ventrals in the male much larger than in the female. It is spread over Europe and N. Asia, and is more or less abundant in the ornamental waters and ponds of Great Britain, but is not found much above lat. 60° N.; it prefers stagnant waters with a muddy bottom, concealing itself in winter in the mud in a torpid state; like the carp it is very tenacious of life; the food consists of worms and aquatic insects, with sometimes seeds and plants. The eggs are deposited in May or June; they are very minute, of a greenish color, about 800,000 in a single female, and are placed among aquatic plants. In its natural state the flesh is apt to be soft, insipid, or ill-flavored, and difficult of digestion; but it is said to be very delicate when the fish are properly fed.

TENCIN, CLAUDINE ALEXANDRINE GUÉRIN DE, a French courtesan and novelist, born in Grenoble in 1681, died in Paris, Dec. 4, 1749. Yielding to the wishes of her family, she became a nun; but, struggling to free herself from her vows, she first succeeded in being transferred as canoness to the chapter of Neuville, near Lyons, where she enjoyed much more liberty, and finally in 1714 obtained her complete secularization. She repaired to Paris, and became first the mistress of the duke of Orleans, and then of the abbé Dubois, who gave her a splendid house. She advanced the fortune of her brother, afterward Cardinal de Tencin and minister of state under Fleury, to whom she was passionately attached, while gaining for herself wealth through her connection with the financier John Law, and fame through her intercourse with Fontenelle, Montesquieu, and other literary characters, whom she entertained at her house and playfully styled her "beasts" or "menagerie." By Destouches-Canon, one of her numerous lovers, she had a child who was abandoned at the porch of the church of St. Jean le Rond, and became afterward the celebrated D'Alembert. In April, 1726, another, La Fresnais, a councillor in the parliament, in a fit of despair killed himself at her house, and in his will accused her of being his destroyer. She was consequently incarcerated in the Bastile; but the charge was proved to be unfounded, and she was released in the beginning of July. She now became more discreet, lived more than ever among the society of wits and gentlemen, made her parlor a school for refined taste and elegance, exchanged letters with Cardinal Lambertini, afterward Benedict XIV., who after his accession sent her his likeness, and wrote novels, which are remarkable for observation, good taste, and perspicuity.

TENDER, in law, an offer to perform an act, to the performance whereof one person is bound to another. The obligation, and so the offer, may be to pay money or to deliver specific articles. If the tender be of money, it is effectual only when the demand is one of money, and is definite in amount, or is capable of being made so. Thus, a tender cannot be pleaded as a defence to an action for general damages upon a contract, nor to an action in covenant, unless the contract be one for the payment of money, as for rent; nor to an action for a tort, as for assault and battery. In short, wherever the claim is for unliquidated damages, the general rule is that no tender is admissible. In the United States, however, cases of involuntary trespass form an exception, founded partly on usage and partly on express statutory provisions.—A tender need not be made by the defendant personally. If made by a third person at his request, it is sufficient; and even if made by a stranger without his knowledge or request, it seems that a subsequent assent of the debtor will operate as a ratification of the agency and make the tender good. Any person may make a valid tender for an idiot. Tender must be made to the creditor personally, or to some one authorized by him to receive the money. Tender to the creditor's attorney, authorized by him to collect the claim, is usually sufficient; and in such a case the tender need not include the amount of the attorney's fee for his letter to the debtor.—At common law, a tender must be made on the very day the money is due, if that day be made certain by the contract. But the statutes and usages of the states generally permit the tender to be made after that day, if before the action is brought; and in some it may be made after the action is brought. Tender is generally not good if made before the debt is due, but may in some cases be so if it includes interest up to the day of maturity.—A tender of money is not complete without production and offer of the money, unless the creditor expressly or impliedly waives the production. Thus it is said not to be enough in a plea of tender, if the plaintiff did not object to receive the money, for the defendant to prove that he had the money in his pocket, and said to the creditor that he had it ready for him, and asked him to take it. He ought to have produced and offered the money specifically. What amounts to a waiver on the part of the creditor is a nice if not difficult question. It seems from the cases that the creditor may not only waive the actual production of the money, but the actual possession of it in hand by the debtor. The debtor is not bound to count out the money if he has it and offers it.—The tender must be made without any condition that the creditor may with good reason object to. A demand of a receipt in full of all demands has often been held to invalidate a tender; not so much, however, because a receipt was asked for, as because part was offered in full payment. And it seems that a debtor would lose the benefit of a tender if he should accompany it with a demand of a receipt for the sum that he pays, and because it was refused should retain the money. Tender of a larger sum than is due, with a request of the change or the balance, is not good. Thus the offer of a $5 bill, with a demand of the change, is not a good tender of $4. Refusal of the money offered, for reasons distinct from the manner in which the offer is made, as for the insufficiency of the sum or the like, is a waiver of all objection to the form of the tender. The tender should be made in lawful coin of the United States, or in money made lawful by the state in which it is offered. A tender of good and current bank notes is good if no objection is made on the ground that they are not money.—As tender means not only that the debtor was once ready and willing to pay, but that he has always been so and still is, the effect of it will be destroyed if the creditor can show a subsequent demand by him of the proper fulfilment of the contract at the proper time, and a refusal by the debtor. Some authorities have held that a demand and refusal may in some cases have the effect of annulling a tender even if they take place before the tender was made; although generally, if not universally in the United States, a tender is valid and effectual if made at any time after a debt is due.—Tender does not bar a debt as payment would, but rather establishes the liability of the defendant; for, in general, he is liable to pay the sum which he tenders whenever he is required to do so. But the tender stops the recovery of damages or interest for delay in payment, and gives the defendant subsequent costs, provided the plaintiff recovers nothing beyond the sum tendered. —It may be regarded as settled that acts which would constitute a sufficient tender of money will not always have this effect in relation to chattels. Thus, if one who is bound to pay money to another at a certain time and place, is there with the money in his pocket for the purpose of paying it, and is prevented from doing so only by the absence of the payee, this has the full effect of a tender. But if he is bound to deliver chattels at a particular time and place, it may not be enough that he has them there; they may be mingled with others of the like kind which he is not to deliver, or they may need some act of separation, identification, or completion, before they can become the property of the other party. As in sales the property in chattels does not pass while any such act remains to be done, so if there be an obligation to deliver those articles, it may be said as a general rule that the obligation is not discharged so long as any thing is left undone which would prevent the property from passing under a sale. If one bound to deliver 20 bushels of wheat at a certain time and place, came there with 50 bushels in his wagon, all of the same quality, and in one mass, with the purpose of measuring out 20 bushels, and was prevented from doing so only by the absence of the promisee, this would probably be held as a sufficient tender. The tender of goods may be made to an agent or by an agent, and must be equally unconditional as if of money; and if the agent of the deliverer has orders to deliver the chattels to the receiver only if he will cancel and deliver up the contract, this is not a tender, although the agent had the chattels at the proper time and place.—Generally, if no time or place be specified, the articles are to be delivered where they were at the time of the contract, unless collateral circumstances designate a different place. If the time be fixed, but not the place, it will be presumed that the deliverer was to bring the articles to the receiver at that time; and for that purpose he must go with the chattels to the residence of the receiver, unless something in their very nature or use, or some other circumstance of equivalent force, distinctly implies that they are to be left at some other place. And it may happen from the cumbrousness of the articles, or other circumstances, that it is obviously reasonable and just for the deliverer to ascertain from the receiver, long enough beforehand, where they shall be delivered; and then he will be held to this as a legal obligation. If the receiver refuses or neglects to appoint a place, or purposely avoids receiving notice of a place, the deliverer may appoint any place with a reasonable regard to the convenience of the other party, and there deliver the articles. If no expressions used by the parties and nothing in the nature of the goods or the circumstances of the case control the presumption, then the place where the promise is made is the place where it should be performed; and no action can be maintained upon such a promise unless the plaintiff can show a demand at the proper place and time, or a readiness to receive, and notice equivalent to a demand, or else that the demand would have been nugatory because the defendant could not have complied with it. If by the terms of the contract specific articles are to be delivered at a certain time and place in payment of an existing debt, this contract is fully discharged and the debt is paid by a complete and legal tender of the articles at the time and place, although the promisee was not there to receive them; and no action can be thereafter maintained on the contract. But the property in the goods has passed to the creditor, and he may retain them as his own, or take them elsewhere; or he may demand them, and if they are refused bring an action for them as his own.

TENDON, the firm fibrous bundle or cord, the continuation of the intermuscular areolar tissue, by which a muscle is ordinarily attached to bone. Tendons are of a shining white color, dense and inextensible, flattened or rounded, and more or less elongated; when very much flattened and membranous, they are called *aponeuroses* and sometimes *fasciæ*. They glide smoothly in sheaths, especially in the extremities, and on the surface of flexion of the limbs; in some cases many are enveloped in a single sheath, in others they are kept in place by an annular ligament, as in the wrist and ankle. One of the most important is the *tendo Achillis*, by which the muscles of the calf are attached to the heel bone, so named from Achilles having received his death wound there from Paris during the siege of Troy; it is often contracted, as in the various forms of club foot, and is frequently divided to enable the foot to be brought down by extension apparatus. Contractions of the tendons of the fingers and toes, and of the elbow and ham, are frequently remedied by the same subcutaneous method of tenotomy; *torticollis* or wry neck is also benefited by the division of the tendon of the sterno-mastoid muscle. One of the most beautiful contrivances and evidences of design in the human body is the manner in which the superficial flexor tendons in the fingers stop short at the middle phalanx, and divide to allow the tendons of the deep flexor to pass through to the terminal phalanx, thus securing compactness and beauty of shape, with freedom and extent of motion.

TENEDOS (in earliest antiquity *Calydna*, *Leucophrys*, *Phœnice*, and *Lyrnessus*), a small island in the Ægæan sea or Grecian archipelago, now belonging to Turkey, about 12 m. from the mouth of the Hellespont or Dardanelles, and 4 m. W. from the coast of Asia Minor. It is about 5 m. long by 2 broad, and owes its chief importance to its position. In the legend of the Trojan war it is mentioned as the place to which the Greeks withdrew after leaving the wooden horse before Troy, and it was employed in the Persian war by Xerxes as a naval station. Subsequently, on several occasions, as in the Peloponnesian, Macedonian, and Mithridatic wars, it figured conspicuously as a stronghold.

TENERANI, Pietro, an Italian sculptor, born in Torano, near Carrara, in the latter part of the 18th century. After studying a while under his uncle Pietro Marchetti and in the academy of Carrara, he established himself in 1814 in Rome, and finished his art education in the studio of Thorwaldsen. His "Psyche with the Box of Pandora" (1819), now in the Lenzoni palace, Florence, was succeeded by numerous works illustrating both Christian and classical mythological subjects. Of his religious works, the most remarkable are "Christ on the Cross," in silver, in the church of San Steffano, Pisa; the "Descent from the Cross," in the Torlonia chapel of the church of St. John Lateran, Rome; the martyrdom of Eudorus, &c.; beside a number of statues of saints and monumental works. Of the latter class, the "Angel of the Last Judgment," in the church of Sta. Maria in Rome, is a characteristic specimen. Among his classical subjects may be enumerated the "Swooning Psyche," the "Faun playing on a Flute," the "Flora," in the possession of the queen of England, and the "Cupid extracting a Thorn from the Foot of Venus," of several of which he has executed duplicates. His statues of public characters include those of Leuchtenberg and Orloff at St. Petersburg, of Ferdinand II. and III. of Naples, of Bolivar, and of Count Rossi, who was killed in Rome in 1848. His portrait busts are also numerous, those of Thorwaldsen and Pius IX. being among the best. He is professor of sculpture in the academy of St. Luke, Rome.

TENERIFFE (Sp. *Tenerife*), the principal island of the Canary group, 90 m. N. W. from Cape Bojador on the African coast, between lat. 28° and 28° 36′ N., and long. 16° 5′ and 16° 55′ W.; extreme length 60 m., breadth 20 m.; area, about 1,000 sq. m.; pop. 85,000. The coast is very irregular, and is formed of an uninterrupted succession of lofty cliffs penetrated by a few narrow ravines. The only good harbor is that of Santa Cruz, the chief town, upon the N. E. side, which is protected by two rocky points enclosing a semi-circular bay. Teneriffe is wholly of volcanic formation, and is composed of masses of trachyte, lava, and basalt. The peak of Teyde, toward the N. W. of the island, attains the height of 12,205 feet above the sea. The crater is situated at the summit, and is about 1 m. in diameter; but the eruptions which have happened during the last 3,000 or 4,000 years appear to have been made through the sides. There are 5 other craters, one of them much larger. Since the island was occupied by the Spaniards in 1496 only two eruptions have taken place, one in 1706 and the last in 1798; but clouds of vapor frequently ascend from the craters. Along the base of the great mountain and for some distance up its sides there are villages, fields, gardens, and vineyards, next to which succeeds a tract of forest, and beyond that is a barren plain covered with blocks of lava and pumice stone. The N. E. part of Teneriffe is the most fertile, but only about ⅐ of the whole surface is arable. The chief productions are cochineal, wine, silk, maize, wheat, oranges, potatoes, pulse, almonds, honey, wax, &c.

TENIERS, David, called the elder, a Flemish painter, born in Antwerp in 1582, died there in 1649. He was educated in the school of Rubens, and subsequently studied in Italy, where he acquired from his countryman Adam Elsheimer a taste for cabinet pictures, to which he exclusively devoted himself after his return to Antwerp. His favorite subjects were rural sports and merrymakings, alehouse interiors, chemists' laboratories, and grotesque subjects, such as the temptation of St. Anthony, all of which he treated with great humor and fidelity to nature. He was greatly distinguished as a colorist, and his pictures commanded during his lifetime large prices.—David, the younger, born in Antwerp in 1610, died in Brussels in 1690 or 1694. He has been said on doubtful authority to have studied under Rubens, Adrian Brauwer, and Elsheimer, but probably received most of his instruction from his father. The archduke Leopold, then governor of the Spanish Netherlands, having appointed him his principal painter, with the superintendence of his gallery of Italian and Flemish masters in Brussels, he soon rose to the head of his profession. He was distinguished by a talent for imitating the works of others, and executed views of the interior of the grand duke's gallery, representing the walls with the pictures on them, and faithfully giving the style of each painter. He also painted a number of ingenious compositions of his own in the style of Tintoretto, Paul Veronese, Bassano, Rubens, and others. His authentic works amount to upward of 1,000, and bring prices varying from 800 to 1,500 and 2,000 guineas. There are also about 500 spurious pictures attributed to him. Some of his pictures are of great size, one at Schleissheim, 13 feet 6 inches by 10 feet, containing 1,138 figures, of which those in the foreground are 12 inches in height. He worked with great rapidity, and some of his thinly painted pictures are said to have been begun and finished at a single sitting.

TENISON, Thomas, an English prelate, born in Cottenham, Cambridgeshire, Sept. 29, 1636, died Dec. 14, 1715. He was graduated at Corpus Christi college, Cambridge, in 1657, and began to study medicine, but in 1659 was privately ordained. After the restoration he was appointed to St. Andrew's church, Cambridge, and in 1680 was presented by Charles II. to the living of St. Martin's in the Fields, where he endowed a free school, and built and furnished a library. William III. made him archdeacon of London in 1689, bishop of Lincoln in 1691, and archbishop of Canterbury in 1694, on the death of Dr. Tillotson.

TENNANT, William, a Scottish poet and orientalist, born in Easter Anstruther, Fifeshire, in 1785, died near Dollar, Feb. 15, 1848. He was educated at the university of St. Andrew's; but, debarred from active employment by having lost at an early age the use of his feet, he became in 1801 clerk to his brother, a corn factor of Glasgow, and in this situation studied zealously and unaided the modern languages and Hebrew. Returning to Anstruther, he published in 1812 "Anster Fair," a humorous poem in the *ottava rima*, which received high praise from Jeffrey in the "Edinburgh Review," and passed through many editions. In 1813 he became parish schoolmaster of Dunino, and while teaching there made himself master of the Arabic, Syriac, and Persian languages. In 1816 he taught at Lasswade, and in 1819 went to Dollar academy, where he acted as instructor of the classical and oriental languages until 1835, when he was made professor of oriental languages in St. Mary's college, St. Andrew's. Here he compiled Syriac and Chaldaic grammars, which appeared in 1840. Beside writing some miscellaneous poems and translations from the Persian, Greek, and German, he published "The Thane of Fife" (1822); "Cardinal Beaton" (1823), a tragedy; "John Baliol" (1825), a drama; "The Dinging Down of the Cathedral" (of St. Andrew's); "Hebrew Dramas founded on Bible History" (1845); and a "Life of Allan Ramsay" was first issued in New York (1852).

TENNEMANN, Wilhelm Gottlieb, a German historian of philosophy, born at Brembach, near Erfurt, Dec. 7, 1761, died in Marburg, Sept. 30, 1819. He studied at Erfurt, where he abandoned theology for philosophy, and at Jena, where he was both one of the first opponents and one of the first adherents of the Kantian system. He became professor extraordinary of philosophy at Jena in 1798, and at Marburg in 1804, and retained the latter position till his death. His most important work is the *Geschichte der Philosophie* (11 vols., Leipsic, 1798–1819), in which all systems are regarded from the standpoint of the critical school. An abridgment, entitled *Grundriss der Geschichte der Philosophie* (Leipsic, 1812), has been translated into English by Arthur Johnson (1832; revised by J. R. Morell, 1852). Among his other publications are: *Lehren und Meinungen der Sokratiker über Unsterblichkeit der Seele* (Jena, 1791); *System der Platonischen Philosophie* (4 vols., Leipsic, 1792–'4); and translations into German from Locke, Hume, and De Gerando.

TENNENT, Gilbert, an American clergyman, born in the county of Armagh, Ireland, Feb. 5, 1703, died in Philadelphia, July 23, 1764. He was the son of the Rev. William Tennent, an Irish Presbyterian clergyman who emigrated to America in 1718, and several of whose sons and grandsons entered the ministry. He was ordained in 1726 at New Brunswick, N. J., and remained there as pastor till 1743, though he spent several months with Whitefield on a preaching tour in New England, where his eloquence and terrible descriptions of the eternal punishment due the sinner produced a great effect. In 1741 he was instrumental, by his fiery denunciations of those who differed from him in doctrine, in causing a division in the Presbyterian church, which 17 years later he did his utmost to heal. In 1743 he was called to the charge of a Presbyterian church in Philadelphia, where he resided during the remainder of his life, excepting a visit to England in 1753, in company with the Rev. Samuel Davies, to solicit aid for the college of New Jersey. He published many works, but few of permanent interest.—William, an American clergyman, brother of the preceding, born in the county of Antrim, Ireland, Jan. 3, 1705, died at Freehold, N. J., March 8, 1777. When he had nearly completed his theological course, he became seriously ill, fell into a catalepsy or trance, and remained for several days in a condition of apparent death. His physician, perceiving a slight tremor under his left arm, refused to consent to his burial; and, although his friends were satisfied that he was dead, his funeral was postponed for 3 days, and subsequently for several hours, efforts being made for his resuscitation, which finally occurred just as his physician was giving up in despair. His recovery was very slow and painful, and for many months his memory and intellectual faculties were almost lost, but were eventually and suddenly restored. Mr. Tennent's own account of his emotions during this period was, that at the moment of his apparent decease he found himself surrounded by an unutterable glory, and saw a great multitude, apparently in the height of bliss, singing most melodiously; and that when he was about to join the great and happy multitude, some one came to him, looked him full in the face, and said: "You must go back." At the shock this intelligence gave him he opened his eyes, and, finding himself in the world, fainted. For 3 years he said the recollection of what he had seen and heard was so intense as to make earthly things seem worthless. Mr. Tennent was ordained in 1733 at Freehold, Monmouth co., N. J., where he continued as pastor 44 years. He published only a few occasional sermons. A memoir of him, giving a very full account of his trance, was prepared and published by Judge Elias Boudinot.

TENNENT, Sir James Emerson, a British author and statesman, born in Belfast, April 7, 1804. His name was originally Emerson, Tennent being added on the succession of his wife to the estate of her father, William Tennent. He was educated at Trinity college, Dublin, and was called to the bar at Lincoln's Inn in 1831, but never practised. Under the name of Emerson he published "Travels in Greece" (1825); "Letters from the Ægean" (2 vols., 1829); and "History of Modern Greece" (2 vols., 1830). In 1832 he was elected to parliament for Belfast, and continued to represent that city most of the time till 1845. From 1841 to 1845 he was secretary to the India board; in 1845 he was appointed civil secretary to the colonial government of Ceylon, and knighted. He returned in 1850, and in 1852 was member of parliament for Lisburn, and for a few months of that year secretary of the poor law board. In Nov. 1852, he became one of the joint secretaries of the board of trade, which office he still holds. He is also deputy lieutenant of the county of Sligo, and a magistrate for Antrim and Down. His works, beside those already mentioned, are: "Belgium" (2 vols., 1841); "A Treatise on the Copyright of Designs for Printed Fabrics, &c." (1841); "Christianity in Ceylon, with an Historical Sketch of the Brahminical and Buddhist Superstitions" (8vo., 1850); "Wine, its Use and Taxation" (8vo., 1855); "Account of Ceylon" (2 vols., 1859); and "Sketches of the Natural History of Ceylon" (1861).

TENNESSEE, one of the southern states of the American Union, and the third admitted under the federal constitution, situated between lat. 35° and 36° 30′ N., and long. 81° 37′ and 90° 28′ W.; greatest length from E. to W. about 430 m., breadth 105 m.; area, about 45,600 sq. m., or 29,384,000 acres. Its shape is rhomboidal, its E. and W. sides sloping at considerable, though not equal angles. It is bounded N. by Kentucky and Virginia, S. E. by North Carolina, S. by Georgia, Alabama, and Mississippi, and W. by Arkansas and Missouri, from which it is separated by the Mississippi river. The state is divided into 84 counties, viz.: Anderson, Bedford, Benton, Bledsoe, Blount, Bradley, Campbell, Cannon, Carroll, Carter, Cheatham, Claiborne, Cocke, Coffee, Cumberland, Davidson, Decatur, De Kalb, Dickson, Dyer, Fayette, Fentress, Franklin, Gibson, Giles, Granger, Greene, Grundy, Hamilton, Hancock, Hardin, Hawkins, Hardeman, Haywood, Henderson, Henry, Hickman, Humphreys, Jackson, Jefferson, Johnson, Knox, Lauderdale, Lawrence, Lewis, Lincoln, McMinn, McNairy, Macon, Madison, Marion, Marshall, Maury, Meigs, Monroe, Montgomery, Morgan, Obion, Overton, Perry, Polk, Putnam, Rhea, Roane, Robertson, Rutherford, Scott, Sequatchie, Sevier, Shelby, Smith, Stewart, Sullivan, Sumner, Tipton, Union, Van Buren, Warren, Washington, Wayne, Weakley, White, Williamson, and Wilson. The chief cities and towns are: Nashville, the seat of government; Memphis, the most important commercial point; Knoxville, Columbia, Murfreesborough, Shelbyville, Lebanon, Pulaski, Jackson, Brownsville, Franklin, Greenville, and Dresden. The following table exhibits the decennial progress of population since 1790:

Census.	Whites.	Free colored	Slaves.	Total.	Increase per cent.
1790....	32,013	361	3,417	35,791	..
1800....	91,709	309	13,584	105,602	195.05
1810....	215,875	1,317	44,535	261,727	147.84
1820....	339,927	2,779	80,107	422,813	61.55
1830....	535,746	4,555	141,603	681,904	61.28
1840....	640,627	5,524	183,059	829,210	21.60
1850....	756,836	6,422	239,459	1,002,717	20.92
1860....	826,828	7,235	275,784	1,109,847	10.68

Density of population in 1850, 21.98 to the square mile; in 1860, 24.12; ratio to the total population of the Union in 1860, 3.85 per cent. Of the white population in 1850, 382,235 were males and 374,601 females; of the free colored, 3,117 males and 3,305 females; and of the slaves, 118,780 males and 120,679 females. Of the free colored, 2,646 were blacks and 3,776 mulattoes; of the slaves, 219,103 blacks and 20,356 mulattoes. The white and free colored inhabited 129,419 dwellings, and constituted 130,604 families. Births (white and free colored) in 1849–'50, 23,090 (3.03 per cent.); deaths, 7,825 (1.03 per cent.), and including slaves, 11,874 (1.18 per cent.); married (whites), 7,872 (1.04 per cent.). Deaf and dumb, 377; blind, 474; insane, 407; idiotic, 846. Of the white and free colored population (763,258), there were born in the state 585,835; in other states, 170,184; in foreign countries, 5,653; unknown, 1,586. Ages of the total population: under 1 year, 30,151; 1 and under 5 years, 140,117; 5 and under 10, 157,608; 10 and under 15, 142,257; 15 and under 20, 118,260; 20 and under 30, 172,351; 30 and under 40, 101,250; 40 and under 50, 65,579; 50 and under 60, 40,486; 60 and under 70, 21,255; 70 and under 80, 9,483; 80 and under 90, 2,976; 90 and under 100, 572; 100 and upward, 148; unknown, 224. The occupations of 168,240 free male persons over 15 years of age were as follows: commerce, trade, manufactures, mechanic arts, and mining, 23,432; agriculture, 118,979; labor not agricultural, 17,559; navigation, 258; law, medicine, and divinity, 3,363; other pursuits requiring education, 3,589; government civil service, 705; domestic servants, 10; other pursuits, 345. The number employed in manufacturing establishments in 1820 was 7,860; in 1840, 17,815; in 1850, 12,032. The number of slaveholders in 1850 was 33,864, viz.: holders of 1 slave, 7,616; of 1 and under 5 slaves, 10,582; of 5 and under 10, 8,314; of 10 and under 20, 4,852; of 20 and under 50, 2,202; of 50 and under 100, 276; of 100 and under 200, 19; of 200 and under 300, 2; of 300 and under 500, 1. The federal representative population of Tennessee in 1850 was 906,933, and entitled the state to 10 members of congress; in 1860 it was 1,031,794, giving, under the new apportionment, 8 members.—The Mississippi river, washing the western border of the state, gives it important commercial advantages which have been successfully improved. The Cumberland river, rising in Kentucky, traverses N. Tennessee for a distance of 250 m., and returning to Kentucky falls into the Ohio at Smithland; it is navigable by the largest steamboats to Nashville, and by smaller boats to Waitsburg, Ky., 400 m. above. The Tennessee traverses the state in a S. W. direction, passes across the N. part of Alabama, and returning runs due N. across Tennessee and Kentucky into the Ohio at Paducah. The other principal streams are the Holston and its affluents, the Watauga, Nolichucky, French Broad, and Little river; the Hiawassee, Sequatchie, Duck, and Elk, all tributaries of the Tennessee; the Caney fork of the Cumberland; and the Obion, Hatchie, and Wolf, which flow into the Mississippi. Nearly all of these are navigable by steamboats or small vessels. The facilities for water communication are unsurpassed, and there is a great abundance of water power for manufacturing purposes.—The range of mountains which forms the boundary between North Carolina and Tennessee bears in its different divisions the local names of Stone, Iron, Bald, Smoky, and Unaka mountains. South-west of this ridge is the valley enclosed by it and the Blue ridge, in which are the head streams of the Tennessee, and further W. are the Cumberland mountains, which stretch across the state from N. to S., bearing a little S. W., and in the middle of the state take a W.

direction, gradually diminishing into moderately hilly ridges, enclosing beautiful and fertile valleys. These mountains in some places occupy a breadth of 50 m., and are a prolongation of the Alleghany range and the Laurel and Chestnut ridges. All the mountains of Tennessee belong to the great Appalachian chain, and the loftiest are not more than 2,000 feet above the level of the sea. The surface of the state consists of three natural divisions: East Tennessee, comprising the mountainous region from the E. boundary to the Cumberland mountains; Middle Tennessee, embracing the hilly portion of the state from the Cumberland mountains to the Tennessee river; and West Tennessee, composed of the level part lying between the Tennessee and Mississippi rivers. —Tennessee is divided geologically into 5 districts or cross belts running from N. to S. The first, comprising the interval between the Mississippi and Tennessee rivers, is occupied (in an order from W. to E.) by the alluvial, the tertiary, and the cretaceous formations of the gulf of Mexico and the Atlantic seaboard. The 2d or central portion of the state, from the Tennessee river to the W. foot of the Cumberland mountains, is a rolling country of nearly horizontal palæozoic rocks, with a great island-like district of lower silurian ground in the centre, watered by the Cumberland, Stone's, Duck, and Elk rivers, and surrounded on all sides by devonian hills. The 3d is the mountain division of the coal; a plateau 3,000 feet above the sea, 40 m. wide by 140 long, bounded on the E. by the valleys of the upper Tennessee and Holston rivers, and covered with a plate of carboniferous rocks, which is thinned and broken up into patches and mounds as it approaches the Alabama state line. The last workable coal mines of any importance going S. are the Sewannee mines at the N. end of a branch railroad 16 m. long, which leaves the Nashville and Chattanooga railroad at the tunnel where it crosses the mountain. The Sequatchee river valley, cut down through this plateau to its base, follows the line of a profound fault like those which characterize the belt next to be described. The 4th district is the great valley of Knoxville or East Tennessee, through which the waters of S. W. Virginia flow to compose the upper Tennessee river. It is a prolongation of the great valley of Virginia, the valley of the Shenandoah, and the valley of Harrisburg and Reading, Penn. Its rocks are of silurian age, upturned and broken by enormous faults, which bring them against the coal. On the E. side of this great valley rise the Onaka or Smoky mountains, forming a 5th district, the true prolongation of the Blue ridge and South mountain range, extending laterally into North Carolina, and composed of rocks of undetermined age, the equivalents of the slate rock, gneiss, and marble of western Massachusetts and Vermont, and probably of "calciferous sandrock" age. Among these rocks (as at Alton in Canada) occur the remarkable copper mines of Ducktown, Polk co. (See COPPER MINES.) The limestone of the great valley yields, at innumerable places, fine limonite or brown hematite iron ore, affording stock for many forges and furnaces, which receive an additional supply from long straight outcrops of "dyestone" or upper silurian fossil ore along the whole W. side of the great valley. Lead and zinc ores are also met with, but have been little worked. This district also affords brecciated marbles, large quantities of which have been introduced in the new capitol at Washington. (See MARBLE.) The remarkable iron-making region, with its numerous furnaces, in the W. part of the state, between the Tennessee and Cumberland rivers, is a prolongation and widening out southward of the iron region of western Kentucky. Its ores are subcarboniferous brown hematite deposits in hills of sand and gravel. (See IRON.)—Like other regions where the cavernous limestone is the prevailing surface rock, Tennessee has numerous caves, of which but few have yet been explored. In the Cumberland mountains are several which are 100 feet or more below the surface and several miles in extent. One has been descended to a depth of 400 feet, where a stream of water was found having sufficient force and fall to drive the machinery of a mill. Another, on the summit of Cumberland mountain, is perpendicular in its descent, and its depth has never yet been fathomed. Some of these caves contain fossils and bones of extinct species of animals. Big Bone cave when first explored contained a skeleton of the mastodon. The Enchanted mountain, also one of the Cumberland range, has impressions of the feet of men and animals in the limestone rock. There are throughout the cavernous limestone region occasional "sink holes," as they are termed, where the roof of a cavern has given way under the superincumbent pressure, and a tract of several acres, often with a grove of trees and sometimes with dwellings upon it, has sunk down 75 or 100 feet below its former level. Near Manchester, Coffee co., is an ancient work called the Stone Fort, enclosed by a rude stone embankment by tourists called a wall, upon which trees are growing whose age is estimated at over 500 years. This mysterious enclosure lies in a peninsula formed by the near approach of two forks of Duck river, and occupies an area of 47 acres. —The climate is generally mild and remarkably salubrious, excepting in the swampy districts of the N. W. The eastern division is noted for its pure, bracing mountain air. East Tennessee, from its rough and mountainous character, has but a limited surface adapted to cultivation. The soil of Middle Tennessee is generally good, producing large crops of wheat, rye, oats, Indian corn, buckwheat, barley, potatoes, hemp, hay, sweet potatoes, flax, cotton, and tobacco. The western division is almost level, and cotton, tobacco, and all kinds of grain are grown in extraordinary abundance.

The soil of this part is a rich black mould of unsurpassed fertility. Along the banks of the Mississippi and Tennessee are extensive cane brakes, covered with reeds of immense size. The state altogether forms one of the finest agricultural regions on the continent. The country is well watered, and has an abundance of choice timber. The N. W. part contains an extensive tract of swampy land. The high mountains in the east are covered with forests of pine, which yield tar, pitch, turpentine, and lumber for exportation. On the mountain slopes the sugar maple, cedar, juniper, and savin are also abundant; and in the lower lands as well as in Middle Tennessee the poplar, hickory, black walnut, oak, beech, locust, and cherry are found. In the swamps and lowlands of West Tennessee the cypress, hacmatac, cottonwood, and swamp cedar occur in large quantities. The pawpaw, a low bushy tree or shrub, bearing a fruit somewhat resembling the banana, though inferior to it, is found in the river bottoms. The wild animals of the state are the bear, found only in the mountainous districts, deer, raccoons, foxes, opossums, and squirrels. Horses, cattle, sheep, and swine are raised on a large scale, and many thousands are annually exported. The hills and mountain slopes afford an abundance of fine pasturage. Much attention is given to wool growing, and there are hundreds of flocks of sheep of the best varieties. A state agricultural bureau was established in 1854, and an annual bounty is paid to district and county societies under certain regulations. In 1859 there were 37 county societies organized in the state, and the general interest taken in these associations is proving highly beneficial to the farmers.—The number of farms and plantations in Tennessee in 1850 was 72,735, embracing 5,175,173 acres of improved and 13,808,849 of unimproved land, valued at $97,851,212; an average of 261 acres to each farm, and of $5.10 per acre. The value of implements and machinery was $5,360,210. The live stock consisted of 270,636 horses, 75,303 asses and mules, 250,456 milch cows, 86,255 working oxen, 414,051 other cattle, 811,591 sheep, and 3,104,800 swine, all valued at $29,978,016. The numbers of asses and mules and of swine were the largest of any state in the Union. The value of animals slaughtered in the census year was $6,401,765. The products of animals were: wool, 1,364,378 lbs.; butter, 8,139,585 lbs.; cheese, 177,681 lbs. The value of live stock, June 1, 1860, was $61,200,000. The crops of 1859, as returned by the census of 1860, were as follows: wheat, 5,410,000 bushels; Indian corn, 50,748,000; oats, 2,343,000; Irish potatoes, 1,175,000; sweet potatoes, 2,614,000; flax, 146,000 lbs.; tobacco, 38,931,000; cotton, 212,000 bales; hay, 146,000 tons; wool, 1,400,000 lbs. During the year ending June 1, 1860, the values of some of the chief manufactures were as follows: sawed and planed lumber, $1,970,000; flour, $3,820,000; steam engines and machinery, $170,000; agricultural implements, $18,000; bar iron, $483,000; pig iron, $457,000; home manufactures, $3,166,000. Total value of products of industry, $17,080,000.—Tennessee, being an interior state, has but little foreign commerce, though Memphis and Nashville are ports of entry; but its commerce with New Orleans, St. Louis, Louisville, and Cincinnati, through its navigable rivers, is very large; and by means of its railroads it is in connection with Mobile, Charleston, and Savannah. The exports are principally live stock, pork, bacon, lard, butter, ginseng, cotton bagging, flour, Indian corn, fruits, tobacco, cotton, hemp, feathers, and a little saltpetre. Tennessee has 23 lines of railroad, all, except some small branch railroads, proceeding from 3 centres, Memphis, Nashville, and Knoxville. Memphis and Nashville are thus connected with Cairo and St. Louis, with New Orleans and Mobile, with Charleston and Savannah, with Bowling Green and Louisville, with Nashville, and with Knoxville, Lynchburg, Richmond, and Washington. Knoxville is connected with Memphis, with Atlanta and Charleston, with Columbia, S. C., and Wilmington, N. C., on the S.; with Danville, Lexington, and Cincinnati on the N.; and with Lynchburg and Richmond on the E. On Jan. 1, 1861, there were 1,412.63 miles of railroad projected in the state, of which 1,283.54 were in operation; the cost of the lines already completed was $30,793,180. On Jan. 1, 1860, there were 34 banks in the state, the condition of which was as follows: capital, $8,067,037; loans and discounts, $11,751,019; stocks, $1,233,432; real estate, $595,759; other investments, $84,355; due by other banks, $2,613,910; notes of other banks, $495,362; specie funds, $932,092; specie, $2,267,710; circulation, $5,538,378; deposits, $4,324,799; due to other banks, $264,627; other liabilities, $462,420.—There is a state hospital for the insane near Nashville, which has accommodations for 250 patients, and has 455 acres of land connected with it; number in the hospital in 1860, 211; the expenditure is about $48,000 per annum. There is also an institution for the instruction of the blind in Nashville, which in 1860 had 36 pupils, and the expenditures were $7,642; the state allows $200 a year for each indigent blind pupil. At Knoxville there is a school for the deaf and dumb, which is also allowed $200 per annum for each indigent pupil; the number of pupils in 1860 was 61, and the expenditures $13,000. The Tennessee penitentiary is at Nashville; it is conducted upon the Auburn or silent system, and on Sept. 30, 1859, had 378 inmates, of whom 366 were white males and 3 white females, 8 black males and 1 black female; 156 were natives of Tennessee, and 60 were born out of the United States; 10 were sentenced for life, and 73 for 10 years and upward.—The following table gives the principal colleges and professional schools with their statistics to about Jan. 1860:

Institutions.	When founded.	Instructors.	Students.	No. of vols. in libraries.	Remarks.
University of Nashville, Nashville	1806	8	104	10,000	
Franklin college, near Nashville	1844	6	106	4,000	
East Tennessee university, Knoxville	1806	..	..	8,500	
Cumberland university, Lebanon	1844	11	165	4,000	Cumberland Presbyterian.
Jackson college, Columbia	1833	5	84	4,500	
Union college, Murfreesborough	1848	6	150	4,600	Baptist.
Greenville college, Greenville	1796	2	20	3,600	
Washington college, Washington co.	1795	3	..	2,000	
South-western university	1860	..	..	..	Not yet in operation.
South-western theological seminary, Maryville	1821	2	24	6,000	Presbyterian.
Theological school of Cumberland university	1855	2	33	..	Cumberland Presbyterian.
Cumberland university law school	1847	3	183	500	
Medical department of Nashville university	1850	8	436	..	
Medical department of East Tennessee university	1856	8	..	..	

There is a common school fund, declared by the constitution to be perpetual and not to be diminished, which consists of $1,500,000 deposited in the bank of Tennessee; of property given by deed, will, or otherwise for the use of the common schools; proceeds of escheated lands and lands donated by the United States; and the personal effects of intestates having no kindred entitled thereto by the laws of distribution. The annual fund for distribution to the schools in 1859 was $230,430.27. It consisted of the dividends from the bank of Tennessee, bonuses of banks and other incorporated companies, 25 cents on each $100 of capital of banks organized under the banking law of the state, and sundry taxes. The distribution is made at the rate of 75 cents per scholar. The scholastic population in 1859 was 294,497. The number of free persons over 20 years of age in the state who could not read or write in 1850 was 78,619. There were in the same year 264 academies in the state, with 404 teachers and 9,928 pupils, and an annual income of $155,902. The college and seminary libraries of the state in 1860 had 46,000 volumes, the state library 9,000 volumes, and other public libraries at least 15,000 volumes more, making a total of 70,000 volumes.—The leading religious denominations in Tennessee are Methodists, Baptists, and Presbyterians. Of the last named there are several distinct organizations, the most prominent of which are the Cumberland and the Old School Presbyterians. In 1850 there were 867 Methodist churches in the state, holding church property to the amount of $381,811; 648 Baptist churches, $271,899; and 363 Presbyterian churches, $367,081. The church accommodations for these 3 denominations the same year were: Methodists, 247,853 sittings; Baptists, 197,315; Presbyterians, 135,517. The other denominations were: Disciples or Campbellites, 63 churches; Episcopalians, 17; Free churches, 30; Friends, 4; Lutherans, 12; Roman Catholics, 4; Union churches, 15; Dunkers, 1, &c. The whole number of churches was 2,027, and of sittings 628,495, and the total value of church property $1,216,201. In 1850 there were 8 daily, 2 triweekly, 36 weekly, and 4 monthly newspapers published in Tennessee, being an aggregate of 50, and printing annually 6,940,750 copies.—The governor of Tennessee is elected by popular vote for 2 years, and has a salary of $3,000 per annum. The legislature consists of a senate of 25 members and a house of representatives of 75, both elected by the people. The legislature meets biennially on the first Monday of October in the odd years. The secretary of state, treasurer, comptroller, and attorney-general are chosen by the legislature on joint ballot, the first named for 4 years, the others for 2 years. The secretary of state receives $800 and fees; treasurer, $1,500 and fees; comptroller, $2,750 and fees; attorney-general, $1,500 and fees. The judiciary consists of a supreme court of 3 judges, having appellate jurisdiction only, elected by the people for 8 years, and receiving a salary of $2,500 each; 15 circuit judges, and 6 chancellors of the court of chancery, also elected by the people for 8 years, and each having a salary of $2,000. There are 3 special courts, the criminal court of Davidson co. (in which Nashville is situated), the criminal court of the city of Memphis, and the common law and chancery court of the same city; the judges of these receive respectively $1,500, $2,000, and $1,800 salary. The present constitution, adopted in 1835, provides that every free white male of the age of 21 years, being a citizen of the United States, and a resident of the county wherein he may offer his vote 6 months next preceding the day of election, may vote for members of the general assembly and other civil officers. Representatives must be at least 21 years of age, and senators 30. No clergyman or person holding office under the U. S. government is eligible to a seat in the legislature; and no person who denies the being of a God or a future state of rewards and punishments can hold any office in the civil department of the state. All persons concerned in duels, either as principals, seconds, aiders, or abettors, are deprived of the right to hold any office of honor or profit. No person who is or has been a collector or holder of public moneys can have a seat in either house of the general assembly until he shall have accounted for and paid into the treasury all sums for which he may be accountable or liable. A plurality of lucrative offices is forbidden. No judge can preside on the trial of any cause in the event of which he may be interested, or where either of the parties is connected with him within the degrees of consanguinity, or in which he may have been counsel, or in which he may have presided in an inferior court, except by consent of all the parties.

The bill of rights is made a part of the constitution, and is not repealable by the legislature, but shall for ever remain inviolate.—In Sept. 1851, the value of the real and personal property of the state was $260,319,611, of which $166,417,907 was real estate, $82,319,728 slaves, other taxables $11,581,982. In Sept. 1859, the aggregate taxable property of the state had increased to $377,208,641; and in 1860 it was $493,903,892. The average value of land per acre in 1859 was $8.19; of slaves, $854.65. The receipts of the state treasury for the two years ending Oct. 1, 1859, were $1,848,094.88, of which was received from taxes on property and polls, $878,037.50; taxes on registration of deeds and lawsuits, $375,509.09; bank of Tennessee dividends, $420,403.82; dividends of turnpike roads, $34,093.04; bank and insurance company bonuses, $29,417.96; railroad sinking fund, $83,858.45. The whole expenditure was $1,704,287.61, of which $20,521.57 belonged to executive, $118,574.05 to legislative, and $226,130.59 to judicial expenses; $457,257.93 was paid as interest, $471,950.80 for educational purposes, $40,512.88 for the deaf and dumb and blind, $66,500 for the insane hospital, $48,683.71 for the penitentiary, $25,841.87 for agricultural purposes, $88,092.60 was invested in the sinking fund, and $29,660.64 expended in the codification and publication of the laws of the state. The absolute liabilities of the state, Oct. 1, 1859, were $3,844,606.66, on which $209,388.25 of interest annually accrues. Of this, $2,063,606.66 were internal improvement bonds, $1,125,000 bank bonds, $608,000 bonds for the erection of the state capitol, and $48,000 bonds for the purchase of the Hermitage, Gen. Jackson's former residence. In addition to these absolute liabilities, the state has contingent liabilities to the amount of $12,799,000 for indorsing bonds of or lending its own bonds to certain railroads and plank or macadamized roads; for the extinction of these a sinking fund has been commenced, which, in Oct. 1859, amounted to $109,750. The aggregate absolute and contingent debt of the state on Oct. 1, 1859, was $16,643,666.66. In 1857 the state owned stocks, mostly productive, costing $3,292,717, and which were estimated as worth $2,244,827.—The name of Tennessee is derived from Tannassee, the Indian name applied to the Little Tennessee river. De Soto probably visited the spot where Memphis now stands as early as 1549. The first settlement was attempted in 1754 by a small body of North Carolinians, but they were speedily driven from the country by the Indians. In 1756 the first permanent settlement was made, and Fort Loudon built on the Tennessee river about 30 m. from the present site of Knoxville. This was the first Anglo-American settlement W. of the Alleghanies and S. of Pennsylvania. For a time the settlers had peaceable intercourse with the Indians, but in a few years the Cherokees were incited by the French to commit depredations, and in 1760 had become so troublesome that an expedition was sent to the relief of the settlements; but after repeated conflicts with the savages the troops retreated; and the Indians seizing the opportunity besieged the garrison at Fort Loudon. Unable to resist their greatly superior force, the whites capitulated, stipulating that they should be allowed to return to North Carolina without molestation. On the second day of their march they were overtaken by the treacherous savages and many of them butchered, and the survivors reduced to captivity. In 1761 another armed force from Virginia and North Carolina entered the district, and after frequent successful battles with the Indians compelled them to sue for peace. A treaty was made, which was observed honorably by the Indians for some time, and the settlements along the Watauga and Holston rivers increased rapidly, being known from 1769 to 1777 as the Watauga association. In 1774 the Tennesseeans assisted their Virginia neighbors in Lord Dunmore's war, and behaved gallantly at the battle of Point Pleasant on the Kanawha, at which the Indians were finally routed. In the colonial assembly of North Carolina in 1776 the territory was represented by deputies as the district of Washington; and in the revolutionary war the settlers flocked to the standard of the colonists, and fought with great bravery at King's mountain, Guilford Court House, and other places in the South. At the close of the revolution a settlement was made on the Cumberland river where Nashville now stands. From 1777 to 1784 the territory formed part of North Carolina, which set apart a portion of the district in the vicinity of Nashville for bounty lands for her revolutionary soldiers. In 1785 the people became dissatisfied with the manner in which they were treated by the government of that state, and organized the state of Franklin, which was maintained until 1788, when it was again united with North Carolina. In 1789 North Carolina ceded the territory to the general government, and in 1790 it was organized, together with Kentucky, as the territory of the United States south of Ohio. In 1794 a distinct territorial government was granted to Tennessee; and in 1796 a state constitution was formed at Knoxville, and Tennessee was admitted into the Union. In the war of 1812 her troops distinguished themselves by their daring and intrepidity; and Andrew Jackson, a citizen of the state, was one of the most distinguished generals of the war. James K. Polk, the 11th president of the United States, was also a citizen of the state. In 1860 Tennessee was the fourth in population and importance among the slave states. On Jan. 17, 1861, the Tennessee legislature, which had been elected in Aug. 1859, resolved to submit to a vote of the people the question of calling a state convention for the passage of a secession ordinance, and the election of members of such convention, to serve if a majority directed its assembling. The vote was taken on Feb. 9, and resulted in a majority of 11,935 against a convention, out of a total vote of 127,591; the union candidates for the convention received a vote of 88,863, against 24,749 for disunion candidates, and no one of the latter was elected. On May 6 the legislature, then in extra session at the call of the governor, passed an act to submit to a vote of the people, on June 8 following, "a declaration of independence and ordinance dissolving the federal relations between the state of Tennessee and the United States of America." On the same day they authorized the governor to raise a provisional force of volunteers for the defence of the state, and, should it become necessary for the safety of the state, to call out the whole available military strength; and for the purpose of carrying out this provision, he was authorized to issue and dispose of $5,000,000 of bonds bearing 8 per cent. interest, and payable in 10 years. On May 7 commissioners appointed by Gov. Harris met the accredited representative of the confederate states at Nashville, and formed a league which the legislature ratified the same day, and by which Tennessee agreed to place her troops under the control of the president of the confederate states, in the same way as if the state had already seceded, and to turn over to the confederacy, as soon as she did secede, all United States property; and the confederate government agreed to refund her expenditures when she seceded. Twenty-five thousand men were raised immediately, and stationed at Nashville and other important points in the state. The number of votes polled at the election on June 8, on the question of separation or no separation, according to the returns, was 152,143, and the majority for separation was stated to be 57,667. During the ensuing 10 months the state raised over 50 regiments for the confederate government, beside 5 or 6 raised by the unionists for the U. S. government. After the capture of Forts Henry and Donelson on the Tennessee and Cumberland rivers, in Feb. 1862, Nashville was evacuated by the confederate forces and occupied by the U. S. army early in March. Andrew Johnson was immediately appointed by President Lincoln military governor of Tennessee, and a strong feeling of loyalty to the Union, which had all along prevailed in the eastern part of the state, began to manifest itself in the western part also. On April 14 the city council of Nashville passed a resolution requesting the mayor of the city to have the flag of the United States placed upon all public property belonging to the corporation; and on May 3 a body of some 150 influential citizens issued a call for a public meeting, as a measure preparatory for the restoration of the constitutional relations of Tennessee with the federal government.

TENNESSEE RIVER, the largest tributary of the Ohio, formed by the union of the Clinch and Holston rivers, which rise in S. W. Virginia, and, after each receiving several affluents, unite near Kingston, Roane co., Tenn. At first the course of the Tennessee is due S. W. to Chattanooga, near the S. line of the state, where it passes through a part of the Cumberland range of mountains in a series of bends, and near the village of Jasper, Marion co., again turns S. W., entering the state of Alabama, and at Gunter's Landing, Marshall co., Ala., assumes a direction nearly W. by N. Between Lauderdale and Lawrence counties it spreads in a broad but shallow expansion called Muscle shoals, flowing over flint and limestone rocks in a succession of rapids for 20 miles, and affording a large amount of water power. At Chickasaw on the Mississippi line the river turns N. W., and forms the boundary thence to the Tennessee line between Alabama and Mississippi. Reëntering Tennessee, after a circuit of nearly 300 m. in Alabama, it flows almost due N. till it reaches Birmingham, Ky., when it turns W. N. W. and enters the Ohio at Paducah, McCracken co., 49½ m. from its mouth, near lat. 37° N. and long. 88° 35′ W. Its length from Kingston to Paducah is estimated at 800 m., but from the source of its longest affluent, the Holston, it is more than 1,100 m. in length. Its principal tributaries are the Sequatchie, Paint Rock, Flint, and Duck rivers, and Elk and Shoal creeks, entering it from the N.; and the Hiawassee, Big Sandy, and Clark's rivers, and Town and Big Bear creeks, from the S. The fall of the river in its whole course is computed at about 2,000 feet. There are no rapids obstructing navigation except those at the Muscle shoals, below which it is navigable to its entrance into the Ohio, 259 m.; and above the shoals steamboats ascend as far as Knoxville, nearly 500 m., though at low water the navigation through the "whirl" in Marion co., Tenn., is difficult. The river has few large towns on its banks, being for much of the distance occupied by plantations; the only important ones are Chattanooga, Tenn., Tuscumbia and Florence, Ala., and Paducah, Ky. The scenery on the upper portion of the river is very beautiful. Darby estimates the area drained by the Tennessee and its tributaries at 41,000 sq. m. The river is seldom frozen, the ice having closed it completely but twice in more than 80 years.

TENNIS, a game of ball, played in a court by 2 persons, or by 4 divided as partners. Tennis courts are usually 96 feet long by 33 wide, with a wall sufficiently high to prevent the loss of balls by ordinary strokes. The ball is struck with a bat, called a racket, whose striking part is covered with a close hard network of animal tendon. The player or party in strikes a ball, or "serves" it, against the head wall of the court. This ball must come to the ground over a line drawn at a given distance from the head wall. It is returned by the player or party out, who must in turn deliver it, by its rebound, at a certain place in the court, when it is again struck by the player in; and so the game continues. Whoever fails to "put the ball up" properly on the head wall, or to deliver it at the proper place on the court, loses. If it is the player in that fails, he loses his hand, and goes out; if it is the player already out, his adversary scores a stroke toward game.—The same game played without a bat, when the ball is struck with the palm of the hand, is called fives, hand tennis, or more commonly hand ball. Hand ball, as still played in Great Britain and the United States, appears to have been the original game; but in France it became the custom to play hand ball with a heavy glove on, then with cords or tendons bound round the hand, or with a piece of wood bound to the hand and wrist, whence it was an obvious step to the racket. From this name of the bat, the game is sometimes popularly called racket.

TENNYSON, Alfred, an English poet, born at Somersby, Lincolnshire, in 1810. He was the third of the 11 or 12 children of Dr. George Clayton Tennyson, a Lincolnshire clergyman, remarkable for energy and physical stature. His uncle Charles Tennyson, known as the Right Hon. Charles Tennyson d'Eyncourt, was authorized by royal license in 1835 to superadd the name of d'Eyncourt to commemorate his descent from that ancient Norman family, and sat in 10 successive parliaments, representing for 20 years the metropolitan borough of Lambeth. It is related that writing tales and verses was a favorite amusement of all the children in the parsonage of Somersby. The 3 eldest sons were educated at Trinity college, Cambridge, and were pupils of Dr. Whewell, then one of the tutors. In 1828 Frederic obtained the prize for a Greek poem; in 1829 Alfred received the chancellor's medal for an English poem, of 250 lines, in blank verse, entitled "Timbuctoo;" and at nearly the same time Alfred and Charles published privately a volume of "Poems by Two Brothers." Charles entered the church, in 1835 became vicar of Grasby, and on inheriting a property in Lincolnshire through his paternal grandmother assumed her family name of Turner. Frederic published in 1854 a collection of poems entitled "Days and Hours." The first volume bearing the name of Alfred Tennyson was "Poems, chiefly Lyrical" (London, 1830), which appeared while he was still an undergraduate. It consisted of about 150 pages, and among its pieces were "Claribel," "Lilian," "Isabel," "Mariana," "Madeline," "The Merman," "The Mermaid," "The Sea Fairies," "The Kraken," "The Dying Swan," and "The Ballad of Oriana." It made little impression, and met with slight favor from the critics, though Professor Wilson declared the author to have genius as well as affectations, and predicted his fame as a poet. In this first series he seems to have cautiously avoided subjects of reality and human interest, to have wilfully abstained from any attempt to delineate actual life, passion, or thought, and to have selected remote and fanciful themes or partial and fugitive phases of life, as if for the exclusive purpose of exercising his art, of attaining mastery over the resources of metre, rhythm, and phraseology, and of elaborating a musical style capable of nobly and naturally expressing the ideas which a ripening intellect and enlarged experience should supply. But, though aiming chiefly at artistic expression, and dwelling upon scenery that is strange and emotions that are scarcely human, the volume exhibits his power of producing pictures in which the landscape and the figures seem alike colored by a dominant idea, in which every descriptive detail and epithet contributes to the dramatic unity of the subject and the intensity of the general impression. His imagination concentrates its resources upon a limited and peculiar view, so that each of his female heroines stands for a detail; Claribel is a shadow, Lilian a peal of laughter, Mariana a melancholy look, and Isabel an attitude. His exquisite rhythm and diction, though sometimes reproached for mannerism and conceits, were best illustrated in "Oriana," "Recollections of the Arabian Nights," and "Mariana in the Moated Grange," which, if expression were the highest aim of poetry, would be among the most perfect of poems. His second volume, published by Moxon (London, 1833), contains several poems from the first, carefully retouched and improved. Among its new pieces were "The Miller's Daughter," "Œnone," "The Palace of Art," "The May Queen," "The Lotos Eaters," "A Dream of Fair Women," "The Lady of Shalott," and "Mariana in the South." In most of these the painter, rather than the poet, continues to predominate, and the pictures are still remarkable rather for a remote beauty than for presenting realities of thought and affection. But "The Miller's Daughter" and "The May Queen" touched upon the interests of every-day life, revealed his power to command popular sympathy, and extended the as yet small circle of his admirers. Their charm consists in the skill with which tragic completeness and intensity are exhibited in lives moved by the simplest affections and enjoyments. "The Lotos Eaters" better illustrates the prevailing character of the volume, being merely picture and music, a rhythmical expression of the feelings of imaginary beings in an imaginary realm. Though "The Palace of Art" was avowedly an allegory, yet the pictorial and musical element prevails over the ethical and philosophical aim, and, instead of dramatizing the process by which the soul becomes discontented with a mere artistic and isolated enjoyment of the universe, the whole force of treatment is expended upon the magnificent description of the palace, while the moral is stated but not developed. His second collection, like his first, was in the main severely noticed by the critics, and for 9 years he remained silent. His third series (2 vols., 1842) contained, beside some of his former pieces considerably changed, new and various poems which are still among the most admirable illustrations of his power. Among the latter were "Morte d'Arthur," "Godiva," "St. Simeon Stylites," "Ulysses," "St. Agnes," and "Sir Galahad," founded on legendary history; the poems of love, "The Gardener's Daughter," "Dora," "Love and Duty," "Lady Clara Vere de Vere," "The Talking Oak," "The Lord of Burleigh," and "Locksley Hall;" and lyric allegories illustrating great moral problems or laws, as "The Two Voices" and "The Vision of Sin." The "Morte d'Arthur" is essentially the answer of a Christian poet to lamentations of the Christian ritualist and dogmatist over the decay of faith; "Ulysses," admirable in all respects, is a faultless specimen of blank verse; "The Gardener's Daughter" presents a combination of excellences perhaps unrivalled in any other love story, and never deviates from the simplicity of familiar life; and the hero of "Locksley Hall," one of his most finished and brilliant works, rises from an early disappointment in love to find resources in enterprise and action and in glowing anticipations of progress for the human race. No other poem more completely than the last shows his mastery of rhythm and language, or his sympathy with the tendencies and triumphs of the present age. From the publication of these volumes his preëminence among contemporary English poets began to be acknowledged. His next work, "The Princess, a Medley," appeared in 1847. Very diverse judgments were expressed concerning it. A prince and a princess are affianced without having seen each other; the lady repudiates the alliance, but relents after a series of adventures as improbable as the romances of chivalry; and the whole poem is "earnest wed with sport," treating the relation of man and woman with mock-heroic fancy, yet touching history and metaphysics with scientific precision as well as poetical grace, mingling the pleasantry of a picnic party with hopeful interpretations of socialistic theories, and rising seriously at the close to a conception of

> The two-celled heart beating with one full stroke
> Life.

Some of his finest lyrical passages, as the bugle song, are interspersed. In 1850 appeared, at first anonymously, the poems of "In Memoriam," designed to express the feelings caused by the loss of his most intimate friend, the gifted Arthur Henry Hallam, who was betrothed to his sister. They are the "wild and wandering cries" of grief versified, the brief stanzas bodying forth the fancies, passing moods, yearnings, regrets, questionings, and consolations suggested at such a time. The volume contains 129 short poems, each consisting of several elegiac quatrains and presenting one leading idea, and its wisdom and beauty were ripened during an interval of nearly 20 years. In many passages he makes science subservient to poetry, illustrates the conflict between a distrustful intellect and a passionate intuition, and amid dearest hopes and darkest doubts "stretches lame hands of faith and gropes." Philosophical rather than pathetic, sometimes obscure, and traversing a wider circuit of thought than his other poems, the volume is perhaps less popular though often more highly admired than either of his others. He was appointed to the office of poet laureate after the death of Wordsworth, and his next publication was "Maud, and Other Poems," in 1855. The misanthropic hero who tells the story of "Maud" rushes madly from wrecked affections, scorning the social conventions by which he is thwarted, to find comfort and hope in the war which then occupied the British nation. A few critics understood and applauded the poem as significant of the awakening of his countrymen from commercial epicureanism, in which meanness, cheating, crime, and misery were rife, to a generous enthusiasm and martial purpose. Among the minor pieces in the volume was the "Ode on the Death of the Duke of Wellington," the finest work of art which any poet laureate has ever produced in discharge of the functions of his office. In 1859 appeared the "Idyls of the King," four poems, from 700 to 2,000 lines in length, upon a subject long meditated by the author, the legends of King Arthur. In form they hold a position between the idyl, as usually understood, and the epic; in tone, they are purely epic. The materials seem to be drawn from the original French and Welsh sources, rather than from the old English compilation of Mallory; the style is marked by an unaffected simplicity and grandeur suited to the spirit of the Arthurian chivalry; each of the stories is complete in itself; and the last, entitled "Guinevere," has been called his highest effort. The volume touches upon but few of the adventures in the cycle of Arthurian romance, and is believed to be only the commencement of a series of similar poems. —The mind of Tennyson seems in exact harmony with the times in which he lives. In ideas and in phraseology he echoes back the dominant feelings of his age, is touched with the triumphant temper of physical discovery, enlarges the play of thought in the domain of science, exults in endless development and broad analogies, and, while assuming the forward attitude of our hopes and philosophy, also warns against its dangers. His later poems especially reveal his appreciation of the complexities, subtleties, and difficulties of the more advanced stages of thought and history. Even his colloquial pieces, unrivalled for ease and harmony, as "The Epic," "Will Waterproof's Lyrical Monologue," and "The Talking Oak," have been said to wear the demeanor of modern English society. The repose which marks them appeared in some of his earlier productions as a dreamy, indolent air; and he always prefers, both in the natural and moral world, to paint things at rest, and rarely deals with action. His catholic sympathy with the problems and phases of modern life, as much as his formal poetical skill and fastidious taste, has made him the favorite poet of the most cultivated and thoughtful. He lived a rather recluse life for many years in or near London; but latterly, since his marriage, has resided at Farringford, in the Isle of Wight, and receives from the crown beside his salary as laureate a pension of £200. The university of Oxford has created him D.C.L. In person he is of dark complexion and imposing stature and appearance. His poems have passed through many editions both in England and America.

TENOR (Lat. *teneo*, to hold), the second of the 4 parts in harmonical composition, reckoning from the base, or the highest natural and most common of adult male voices, having a general compass from C, the second space in the base, to G, the second line in the treble. The term derives its name from the fact that in the ancient part compositions the tenor sustained or held the plain-song or principal air. The modern practice of giving the air to the soprano or treble is traced to the theatre.

TENREC, or TANREC, an insectivorous mammal of the hedgehog family, and genus *centetes* (Illiger). They differ from hedgehogs in having small cutting teeth, in being covered with spiny bristles mixed with silky hairs, and in their inability to roll themselves completely in a ball. The teeth are: incisors $\frac{4}{6}$ or $\frac{6}{6}$; canines $\frac{1-1}{1-1}$, large, conical, incurved, and separated by a considerable interval from the incisors and molars; cheek teeth $\frac{6-6}{6-6}$; the feet are 5-toed, well adapted for digging; ears short and rounded. There are 3 species described, all inhabitants of Madagascar, of which the best known is the silky tenrec (*C. setosus*, Desm.), 10 to 12 inches long, with no tail and a very long pointed snout; the spines are confined chiefly to the head, neck, and back, are yellowish at the root and black in the remaining portion, and the longest not more than an inch; the hair of the sides and lower parts is yellowish and rough. They live in burrows on the water's edge, passing the greater part of the hottest season in a profound sleep, as ordinary hibernating animals do in winter; they are nocturnal in habit, passing much of their time in the water, searching in the mud for their insect food. Though their flesh, like that of most insectivora, is unpleasant to the taste, it is considered a delicacy by the natives.

TENSAS, an E. N. E. parish of Louisiana, bordering on the Mississippi, and drained by Tensas river and Macon bayou; area, 680 sq. m.; pop. in 1860, 16,080, of whom 14,594 were slaves. The surface is low and flat and the soil fertile. The productions in 1850 were 21,665 bales of cotton, and 338,725 bushels of sweet potatoes. There were 3 churches, and 55 pupils attending a public school. It has steamboat communication with the interior by way of the Tensas river. Capital, St. Joseph.

TENT (Lat. *tendo*, to stretch), a portable habitation formed of cloth or skins of animals stretched upon cords or light frames, and supported by poles set in the ground. Of nomadic tribes, like those of Arabia and the surrounding countries, tents have always been the only habitations. The ancient Hebrews in their wanderings for 40 years through the desert lived exclusively in tents, and frequent allusions to these dwellings are met with in the Old Testament. The nations of the East at an early period brought them to a high state of perfection, and the tents devoted to their sovereigns were fitted up with much magnificence. At the beginning of the Christian era tents appear to have been much used in Judæa, and St. Paul is spoken of as a tent maker (Acts xviii. 3). In the wars of the crusaders the nations of Europe became acquainted with the splendid tents of the Saracens, accounts of which are preserved in the records of that period. Costly furs had also then come into use, and they were employed as a lining, as well as for coverings of tent furniture. Marco Polo found the tents of the khan of Tartary thus fitted out with the richest skins, among which were those of the ermine brought from distant northern countries. In modern times, while tents still continue among barbarous and wandering tribes as their chief dependence for shelter, their use among civilized nations is limited chiefly to military and exploring campaigns.—Though the requirements of tents seem to be very simple, much diversity exists in their forms and manner of construction. In warm and dry climates a mere shelter from the sun stretched upon cords in umbrella form, leaving an open space all around for the circulation of the air, affords sufficient shelter; and the light cloth that forms this cover is easily taken down and transported from place to place. The extension of the sides down to the ground, where they are secured by pins, renders the tent close and better adapted for inclement weather. The great military campaigns of late years have caused much attention to be directed to this subject, and introduced important improvements in tents. The common tent for soldiers was formerly a covering of light duck furnished with two upright poles, to be set in the ground, and a cross pole about 6 feet long extending from one to the other for a ridge; over this the cloth was thrown and drawn out to the ground on each side, and pinned down through loops along the edge. The ends were formed of two triangular pieces, which met and overlapped each other when the sides were drawn out to the proper pitch. These could be closed and tied together, or as usual one end was left partially open with an overlapping flap. The tents used by the French army in the Crimea, up to Oct. 1855, and known as *tentes d'abri*, were wholly of this character, with the exception that the ridge was made by a cord passed from the top of one upright to another, which was then extended down to the ground at each end to brace out the tops of the uprights. For convenience in transporting, the pieces of cloth of which the tents were composed were made to button upon each other over the edges. A tent of more imposing character is made upon a similar plan, but with vertical sides for about two feet above the ground, and a succession of cords secured to the bottom of the sloping part, affording the means of stretching this out toward pins driven in the ground some distance from the tent on each side. An additional piece of cloth, called a fly, is often attached around the lower edge and drawn out to these pins as a further protection against the weather. Marquees are very large tents of this character, for the use of officers or for hospitals. Those in the English service for the latter purpose weigh altogether 652 lbs., and are 29 feet long, 14½ wide, and 15 high, and should accommodate from 18 to 24 men. The ridge pole is 13 ft. 10 in. long, and is set 13 ft. 8 in. above the ground; the vertical height of the sides is 5 ft. 4 in. Where large camp fires are employed, especially by those exploring in northern forests, a form of tent much used for its convenience and comfort is made by stretching a rectangular cloth from the ridge pole down to the ground on one side, and filling in the triangular opening on the two ends by other cloths of sufficient size attached to the edge of the first piece. The whole front is left open, and the heat of the fire made opposite to it is concentrated and reflected by the top and sides, as in the portable ovens used for roasting. Such tents are sometimes known as "baker tents," and in the western prairies they are called "half-faced camps."—Some of the best models of tents are those that have long been used by the North American Indians, and of which the Comanche lodge is one of the best. Capt. (now Gen.) R. B. Marcy, in his useful little work, "The Prairie Traveller," speaks of it as the usual tenement of the prairie tribes, and of the traders, trappers, and hunters who live among them. It consists of 8 to 10 straight peeled poles about 20 feet long, and when set up overlaid with hides or cloth. Three of the poles are tied together at the small ends with one end of a long line, and are raised upright, the large ends being brought out at the same time to the circumference of the circle that is to form the base of the lodge. The other poles are then set up around the same circle with their tops laid in the forks of the first three, and are bound together by winding the long rope several times around them, and further secured by drawing this down and making it fast to the ground. The covering made to fit this frame is next put around it, and an aperture is left for a doorway where the edges come together at the bottom. A blanket affords a movable cover for this. The lower edge of the lodge is fastened to the ground with wooden pins. The apex is left open with a triangular wing or flap on each side, and that toward the wind is constantly stretched out by means of a pole set into a pocket in the end of it which causes it to draw like a sail and produce a draught from the fire, built upon the ground in the centre of the lodge. Major H. H. Sibley of the army produced a modification of this in what is known as the "Sibley tent," in which he dispensed with the poles, and used one upright central standard set into an iron tripod. The tent is thus rendered very convenient for packing and travelling. It was used exclusively and with great satisfaction by the army in Utah in their exposed encampment during the winter of 1857–'8. The central pole and tripod within may be dispensed with where the tent can be conveniently suspended from poles or otherwise from the outside. In very cold weather the tent is made more comfortable and roomy also by excavating a basement about 3 feet deep. A great variety of tents have been brought into use for the service of the army in 1861 and 1862; but the general form of the Comanche lodge is still chiefly employed. An important improvement to the Sibley modification of it consists in making the central upright of an iron pipe of 3 or 4 inches diameter, and using this as a smoke pipe for a small sheet iron stove. Warmth and ventilation are thus both provided for.—Cloths prepared with gutta percha or India rubber afford an impervious material for tents, but are too heavy to be much used. A board of army officers have reported favorably of what are called "tent knapsacks" of gutta percha, invented by Mr. John Rider of New York. Pieces of the cloth are prepared 5 ft. 3 in. long and 3 ft. 8 in. wide, with double edges on one side, and brass studs and button holes along two edges, and straps and buckles on the 4th edge. These can be put together to make a large sheet for a tent, and when taken apart each piece serves as an outer covering for the blanket, overcoat, clothes, &c., of a soldier. Four pieces make a sheet 10 ft. 6 in. long and 7 ft. 4 in. wide, sufficient when pitched on a rope 4 ft. 4 in. above the ground to cover a space 7 ft. 4 in. long and 6 ft. 6 in. wide, which will accommodate 5 men, and may be made to shelter 7. Extra pieces of the material may be used with great advantage to spread on the ground as a protection against dampness.—Major Godfrey Rhodes of the British army has published a work on "Tents and Tent Life;" but none of the tents he describes as used by the armies of Europe are thought to be so well adapted for the service required in respect of comfort, salubrity, convenience, and economy, as the "Sibley tent" and its modifications.

TENTERDEN, Lord. See Abbot, Charles.

TENURE (Lat. *teneo*, to hold), in its most general sense, the mode of holding property. In law it is usually confined to the manner of holding land or real property. The doctrine of tenures was once perhaps the most important and the most difficult branch of the law of England; nor has it now wholly lost either its importance or its difficulty.—The first grand division of tenures is into allodial tenures and feudal tenures. Of the word allodial, both the origin and exact original meaning are uncertain. Practically, however, it means a tenure which unites the right of the lord and the right of the tenant, or all right and title to or interest in the land. Hence, one who held land by allodial tenure had full and unencumbered possession of it, with an absolute right to use and dispose of it at his own pleasure, with no control of any one, and no responsibility to any one. The very phrase we use, of allodial tenure, is inconsistent with the views of some writers, who regard an estate held allodially as held without tenure, because they consider tenure as implying the holding the land of a superior. However this may be, an allodial holding stands in direct contrast with a feudal tenure, of which it was the essential quality that a tenant held it of a lord, and that tenant and lord had each their separate rights and interests in it and over it, or, in the language of the law, their separate estates in it. From this characteristic of allodial tenure, it is sometimes said that all the land in the United States is held by this tenure. We doubt the accuracy of this; not merely because all our law of real estate is derived from and permeated by the influence of the feudal tenures, but because the actual condition of land tenure in many at least of the states is better explained by the theory that it is derived from a feudal tenure, and retains many of its characteristic principles.—It seems to be generally admitted, that previous to the prevalence of the feudal system the lands of European nations were held by allodial tenure, and that during the convulsions of the 9th, 10th, and 11th centuries, it became common for holders of land voluntarily to convert their allodial tenure into a feudal tenure, and so hold of some lord. One reason, and probably the strongest, was to obtain his support and protection in return for the allegiance of the tenant; but it may be believed that another cause of this change was the general desire to profit by the opportunity which the feudal system offered of escaping from the disordered and fragmentary condition of society then prevalent. Historians generally agree that this feudal system was nowhere more fully developed or more firmly established than in Normandy. It was therefore a matter of course, almost indeed of necessity, that when William acquired England under a claim of title, but by the power of a feudal army which he carried with him from his own dominions, he should establish his victorious chiefs upon the land their arms had won; and the readiest if not the only way of doing this, was to give them that land to hold upon that feudal tenure and under that feudal system which were admirably adapted to give to the sovereign lord, at any moment, a martial array, that should combine nearly all the available force of the country, and be supported by all its available resources. He divided the land in unequal portions, observing that gradation of rank and of possession which constituted a characteristic feature of the system. While he who received a single manor became a baron and had his own court, they who received six or more were originally classed as greater barons; and to some of his principal chiefs he gave as many as 700 manors. In this way he divided most of the valuable land of England. His immediate successors followed the same system, and before a century had elapsed the feudal system and the feudal tenures were established over nearly all England. All these tenures rested upon the fee (see FEE); but they were very various, and divided the interest in and the beneficiary use of the land, between the lord and the vassal, in very different proportions. There were generally many lords, for the system of subinfeudation prevailed, and the vassal held of his immediate lord, he of the next higher, and he of the next, the series always going up to and ending with the sovereign. Hence we may say that all tenure rested upon two principles: one, that all land was held of the sovereign, who retained certain rights and interests therein; the other, that all the rights and interests of all the lords, and of the tenant finally in possession, added together, constituted that allodial tenure already mentioned. Of the various incidents of feudal tenure, as reliefs, escheats, civil or military services, and the like, we cannot treat in detail; and of the various kinds of tenure, as for example tenure by copyhold, tenure in gavelkind, and the tenure of borough English, we can say but little. Of copyhold there is nothing in the United States. The principal feature of tenure in gavelkind was that all the sons inherited equally and together, instead of the eldest son alone, which latter is the rule of the feudal system, and is nearly universal in England. (See GAVELKIND, and HEIR.) Of tenure by borough English, the essential principle is, that neither the eldest nor all the sons inherit, but the youngest takes as heir. For this strange custom Littleton accounts by the lesser ability of the youngest son to take care of himself; but a custom prevalent in many parts of the United States offers a more probable explanation of this tenure. It is common in New England, for example, for the eldest son, as he comes to maturity, to receive what assistance his father can give, which is considered as his share of the estate, and with this he goes forth to seek a new home. The same thing is done with other sons as they reach full age; until at length only the youngest son is left to take charge of his parents. When they die he has the homestead; or while they live they relinquish it to him, taking his obligation or trusting to his affection for support. The same custom is said to exist in Bavaria, the Tyrol, and other parts of Germany.—The tenure with which we have most concern is that of socage. This was wholly liberated from the stringent military services which generally prevailed, and the civil services on which such land was held were for the most part easy and honorable. It might be shown, by a historical deduction, that, by a gradual but constant improvement, the present liberties of England have grown out of the tenure of socage. At an early period it became known as "free and common socage;" and as this tenure spread over the country, the severities, restrictions, and encumbrances of the common feudal tenures passed away, until this process was completed by the statute 12 Charles II. (1661), and nearly all the old feudal tenures (all in fact which were in any way burdensome or restrictive of the proper rights of the tenant) were reduced to the tenure of free and common socage. If it be asked why the change was not carried further, and all feudal tenure abolished, so that all the lands of England might be held as allodial, the answer is, that it was thought the change actually made went far enough to secure all desirable liberty, and cast off all burdens. Such has been the tenure of the lands of England to this day; they are held of the sovereign in free and common socage; and when recently learned and able men were appointed commissioners upon the real law of England, they fully considered the question whether it was now desirable to make this further change, and were unanimously of opinion that it was not. This tenure, they held, has all the actual advantages of allodial ownership. The beneficial use which one who holds by this tenure has in the land, comprises, for all practical purposes, a sole, undivided, and unencumbered interest. Escheat remains as a feudal incident to the tenure; and it is a benefit to the lord; but it is one which he cannot profit by if the tenant has an heir or chooses to make a will. The tenant in fee simple of lands held in free and common socage, can make any disposition of them, and carve any estates out of them, which the law of real estate permits; and any one to whom he grants it by sale or gift, or devises it by will, takes title directly from the grantor or testator, and his title is complete without the consent or concurrence of the lord or any action whatever on his part. It may be added that this tenure, unlike most other feudal tenures, has no reference whatever to the rank or occupation of the tenant, or to the purposes to which the lands are applied. It is certain that this was the tenure created or prescribed by all the early colonial charters or patents from which our titles are now derived, as that of the charter of Virginia in 1606; the patent of New England in 1620; the charter of Massachusetts in 1629; of Maryland in 1632; of the province of Maine in 1639; of Connecticut in 1662; of Carolina in 1662; of Rhode Island in 1663; of Pennsylvania in 1681; the act of the general assembly of the colony of New York in 1691; and the charter of Georgia in 1732. But in New York, Pennsylvania, Connecticut, and Michigan all feudal tenures, including of course that of free and common socage, are abolished by statute; and it seems to be held, that under the provisions of the ordinance of 1787 the doctrine of tenures is not in force in any of the states formed out of the territory to which that ordinance applied. Substantially, our tenure unites what is best in both the allodial tenure and that by free and common socage. Nor is the fact without its historical value, that the allodial tenure, which formerly prevailed over all Europe, among all the nations who were the ancestors of European nations and so of our own, after being displaced for more than 1,000 years by the feudal system, is at length reëstablished in full force throughout the United States. And yet there are reasons for thinking the tenure of free and common socage, freed as it certainly is now from all feudal encumbrance, explains and illustrates our law of real estate better than the other theory. One reason is, that the principles of the feudal system do in fact underlie all the doctrines and all the forms of the common law in regard to real estate; and wherever the common law prevails, which it does in all the states excepting Louisiana (where the municipal law is founded upon the Roman civil law), the principles of the feudal law and of feudal tenure must be understood and made use of. Another reason is, that the law of escheat is universal with us (see ESCHEAT), and it is governed by the law of feudal tenure, modified by our statutes. A third reason is, that the important and universal law of eminent domain is far better understood and applied by the theory that all property is held from the sovereign, that is, the state, or people; and that in the original grant on which all title is founded, the sovereign reserved the right to resume the same for his own, that is, for the public use, on making adequate compensation. Yet another reason is, that the obligation of fealty remains in full force. It is now, and here, an obligation only to the sovereign. It is implied, or rather it is expressed, in the oath of allegiance; but it does not depend on this oath. It is the obligation and the duty, which rest on every citizen of the United States, as the condition upon which he holds all property, all interests, and all rights, to be "feall and loiall," as the old law expressed it, to be faithful and loyal to his sovereign; that is, to the state and to the Union.

TEOCALLI. See MEXICO, vol. xi. p. 447.

TEOS, an Ionian city, situated on the W. coast of Asia Minor, on the S. side of a peninsula, between the gulfs of Smyrna and Scala Nova, and about 25 m. S. W. from Smyrna. It is chiefly noted as the birthplace of Anacreon, and contained a celebrated temple of Bacchus. It had two good harbors, and was a flourishing commercial town till the Persian conquest, when most of its inhabitants removed to Abdera. The village of Sighajik, which seems to occupy the site of one of the ports of Teos, has walls constructed from its ruins and covered with interesting inscriptions. There are extensive remains of the theatre and other edifices.

TEPHROSIA (Gr. τεφρος, ash color, that being the hue of the foliage), a genus of ornamental plants of the order *leguminosæ*, with arborescent, half shrubby, or even herbaceous stems, unequally pinnate leaves, and handsome racemed flowers of a red or pale purplish color. The species are numerous and remarkable, those from Asia for their dyeing properties, and those from America for their narcotic. The *anil* of Ceylon yields a blue coloring matter similar to indigo. A purgative medicine is obtained from a South American species. The poison tephrosia (*T. toxicaria*), native of the West Indies, and the East Indian *T. piscatoria*, are used in capturing fishes by throwing their powdered leaves into the streams. A powerful vermifuge is said to be found in the goats' rue (*T. Virginiana*) of the northern United States, a handsome plant, occurring in dry gravelly soils and in sandy pitch pine plains. This plant has short terminal racemes of white and reddish yellow butterfly-shaped flowers, and is sufficiently ornamental for the garden. Its roots penetrate the soil horizontally to great lengths, and being slender and tough they have acquired for the plant the trivial name of catgut. Five other species are known at the south, with purplish blossoms.

TEPLITZ. See Töplitz.

TEQUENDAMA, Falls of. See Bogota, vol. iii. p. 426.

TERAPHIM, a kind of household gods or domestic idols mentioned in the early history of the Hebrews. When Rachel left Mesopotamia she took along the teraphim of her father Laban, which she could conceal in her camel's furniture. When David was pursued by the messengers of Saul, Michal, his wife, laid teraphim in the bed in order to deceive the messenger. From the latter passage it is inferred that they must have borne some resemblance to the human figure. It also seems that they were consulted by the idolatrous as oracles. Nothing more is known concerning them.

TERATOLOGY. See Monster.

TERBURG, Gerard, a Dutch painter, born in Zwolle, in the province of Over-Yssel, in 1608, died in Deventer in 1681. In early life he visited Italy, and, after a sojourn of several years in Paris, settled in Holland and rose to great eminence as a painter of conversation pieces, musical parties, ladies at their toilets, and other compositions of the kind known as genteel life. In 1648 he painted a picture of the plenipotentiaries assembled at the congress of Münster, which, though only 17 inches by 22, was sold in 1837 for nearly $9,500. The reputation acquired by this work led to his being invited to Madrid, where he was much employed by the king, who knighted him, and by the chief nobility. He was less correct in drawing or composition than several of his contemporaries, but excelled nearly all of them in color and the finishing of his draperies. No other artist ever painted white satin dresses with such exquisite skill. His pictures, though for the most part of cabinet size, bring high prices.

TERCEIRA, one of the Azore islands, situated near the centre of the group; extreme length 20 m., average breadth 18 m.; pop. 40,000. Angra, the capital (lat. 38° 30′ N., long. 27° 10′ W.), gives its name to a department composed of the three islands of Terceira, St. George, and Graciosa. The coast is nearly everywhere bold and precipitous, and the surface of the interior is undulating and rises gradually toward the centre, where it becomes mountainous. The summits of the mountains consist mostly of fertile plains, and are not peaked like those of the other islands of the group. Many of the mountain masses are composed of soft pumice, and several destructive landslips have occurred. The island is well watered, and the soil, which consists principally of decomposed lava, is particularly fertile. Its exports of oranges and lemons amount to 20 per cent. of the whole quantity shipped from the Azores. Terceira was the seat of the Portuguese regency during the usurpation of Dom Miguel.

TERCEIRA, count of Villaflor, duke of, a Portuguese general and statesman, born in Lisbon, March 10, 1792, died there, April 26, 1860. He entered the military service at the time of the French invasion. In 1826 he declared for the constitutional charter granted by Dom Pedro, and upon the resignation of that monarch espoused the cause of Maria da Gloria. Made major-general, he defeated and drove to the frontiers of Castile the troops of Dom Miguel. He was made a marshal, but when in 1828 Dom Miguel became regent, he was forced to seek an asylum in England. When the constitutional party raised its banner in Oporto in the same year, he returned, but was obliged to flee a second time. The following year he rejoined the insurgent patriots at the island of Terceira, was made commander-in-chief of the constitutional army, at the head of which he conquered the Azores, and subsequently, transferring his operations to Portugal, ended the rule of Dom Miguel in 1834 by the capitulation of Evora. He now entered the ministry of Palmella, but resigned in 1835, and in 1837 was obliged to leave Portugal once more. Returning, he became minister of war in 1842, and in the insurrection of 1846 he was taken prisoner by the insurgents, but was soon restored to liberty and again became minister. In 1858 he was sent to Germany to conduct to Portugal the princess Stephanie of Hohenzollern, the affianced bride of the king. At the time of his death he was minister and president of the council.

TEREDO. See Ship Worm.

TERENCE (Publius Terentius Afer), a Roman comic poet, born in Carthage about 195 B. C., died about 159. He became a slave of P. Terentius Lucanus, a Roman senator, who gave him an excellent education, and finally freed him. The *Andria* was the first play written by him, and on offering it for representation the curule ædiles referred it to Cæcilius Statius, who immediately detected the genius of the unknown author. The play was not acted, however, until 166, and its success introduced him into the best society of Rome, Lælius and the younger

Scipio being among his associates. Later in life he went to Greece, and while living in that country translated 108 of Menander's comedies. The manner of his death is uncertain, though the common account was that he died of grief in consequence of the loss of all his translations of Menander. Six of his comedies are extant, and for aught we know they are all that he wrote. Beside the *Andria* ("The Woman of Andros"), the plot of which was adopted by Steele in his "Conscious Lovers," there are *Hecyra* ("The Stepmother"), produced in 165; *Heauton-Timoroumenos* ("The Self-Tormentor"), produced in 163; *Eunuchus* ("The Eunuch"), the most popular of his plays, and for which he received the unusual sum of 8,000 sesterces, produced in 162; *Phormio*, produced the same year; and *Adelphi* ("The Brothers"), acted first in 160. The dramas of Terence all belong to the *fabula palliata*, and with the exception of the last two were first performed at the Megalesian games. The plots of his plays were borrowed from Menander; but his Latinity is elegant, and his works have been handed down to our time in a very correct state. There have been numerous imitations of his dramas by the moderns, among whom may be mentioned La Fontaine, Molière, Cumberland, and Garrick. His comedies have also been translated into nearly all the languages of modern Europe. The first edition of them is probably that of Milan (fol., 1470); the last is that of Volbehr in 1846. A translation of his poetry into English blank verse was made by George Colman (4to., London, 1765).

TERMINUS, in Roman mythology, a deity who represented an attribute of Jupiter, or who was Jupiter solely as the protector of boundaries. The origin of his worship was attributed to Numa, who ordered that every one should mark the boundaries of his land by stones consecrated to Jupiter Terminus, and should offer upon them every year at the festival of the *terminalia* sacrifices of cakes, meal, and fruit. This law also applied to the state; but the public termini were neglected in the later period of Roman history, while the termini of private property long retained their sacred character. A terminus stood in the temple of Jupiter in the capitol.

TERMITES, the proper name of the white ants, or the neuropterous insects of the family *termitinæ*. Though they resemble the common ants (*formica*) in their social habits, they belong to a different order, and in many respects come near the orthoptera. In the genus *termes* (Linn.) the antennæ are thread-shaped, with about 20 joints; the eyes small but prominent, and the ocelli 8; the mouth as in orthoptera; thorax distinct, and wings large, long, and membranous; legs short with 4-jointed tarsi; abdomen with a pair of minute caudal appendages. They live in vast communities, principally in the tropics, and do great damage by devouring every thing but metals and stone which comes in their way, gnawing even the interior of the beams of houses, leaving only a thin shell to conceal their operations. According to Latreille there are 5 classes in their communities, males, females, workers, neuters, and soldiers. The males and females are at first exactly alike, and are furnished with 4 very long, nearly equal wings; after impregnation the abdomen of the female increases greatly in size from the immense number of eggs which it contains; as many as 80,000 may be laid by one female in 24 hours, making about 30,000,000 in a year. Most of the community is made up of wingless individuals, resembling the winged insects, but without eyes; these are the workers, which perform all the labors of construction. Others without wings, apparently pupæ, resemble the workers, but have 4 tubercular wing cases on the thorax; these are supposed to be neuters or incomplete females, which attend upon the king and queen and take care of the young brood; the extraordinary fecundity of these ants renders necessary a large class of neuters, which possess the affections of maternity without the power of reproduction. The 5th class, apparently neuters still further developed, have very large jaws, and are the soldiers and defenders of the rest. The constitution of their societies in its general characteristics does not vary essentially from that noticed under Ant. They make edifices of a most remarkable size and complexity, usually on the ground, but sometimes among branches of trees and in houses communicating with the ground by long spiral galleries. When on the ground, the most usual shape is that of a group of irregular cones, frequently 12 feet high, looking like huts of the natives, and so firmly constructed that man and beast can stand on them securely; human works, to be of the same relative size, would tower 5 or 6 times above the Egyptian pyramids, with a base large in proportion; they are built of earth softened in the jaws of the workers, which dries quickly and becomes very hard. A nest is divided internally into numerous chambers and galleries, in one of which the queen is imprisoned, and waited upon in the most attentive manner by numerous special attendants whose apartments are in close proximity to the royal cell; the male is said to lie concealed under one side of the enlarged abdomen of the female. The attendants carry off the eggs as soon as they are laid into separate chambers, where the young when hatched are carefully tended by the nurses. There are generally 2 or 3 roofs within the dome-shaped interior, and the thick walls are perforated by passages leading in various directions to the nurseries, magazines of food, ground floor, and subterranean entrances; the food consists principally of decaying and dried wood, though gums and thickened vegetable juices are stored in their magazines. The different members of the community all seem to know their duty, and perform it without being ordered; the king and queen have no regal authority, and no part of the community is ruled by another; there is in their nests a perfect system of willing coöperation for the general good. Destructive as the termites often are, they play a most important part in the economy of nature by removing decaying wood, which otherwise in a short time would seriously interfere with vegetation in the tropics.—The largest and best known species is the warrior white ant of Africa (*T. fatalis*, Linn., or *T. bellicosus*, Smeath.); in each nest there are a king and queen, and about 100 workers to 1 soldier; the workers are about ¼ of an inch long, always busy and very fast runners; the soldiers, which appear to be the same further developed, are about half an inch long, and the perfect insects from 6/16 to 7/16 of an inch long; it is supposed that 2 or 3 years are requisite for the full development of the species from the egg. Toward the commencement of the rainy season the perfect insects take flight, but are mostly destroyed by the heavy rains; if a pair escape, they are taken by some of the workers which are always running over the ground, and are made the king and queen of a new colony. The pregnant female has the abdomen 3 to 5 inches long and ¾ of an inch wide, about 2,000 times as large as the rest of her body, and 20,000 to 30,000 times as large as that of the workers. The bite of the soldiers is very severe and painful, but not dangerous to a healthy person; they are so savage that they permit themselves to be torn asunder rather than let go their hold. They have many enemies in other ants, birds, and reptiles, which destroy great numbers; the wingless ones are also devoured with avidity by the natives and even by Europeans, who roast them in the manner of coffee, and consider them delicious, nutritious, and wholesome. The *T. mordax* and *T. atrox* of Smeathman, also African, build turret-shaped nests, with a top like the head of a mushroom; the *T. arborum* (Smeath.), of Africa, makes its nest on the exterior of trees, and in the roofs and walls of houses, rendering the latter, except where they fill up with a kind of plaster as they excavate the wood, mere shells and liable to fall from slight causes. For full details on the habits of the white ants the reader is referred to "Insect Architecture," by James Rennie, in the "Library of Entertaining Knowledge" (London, 1830-'31).—There are other species in tropical Asia, and even 2 or 3 in southern Europe. The *T. lucifugus* (Rossi) builds in trees, especially in the interior of oaks and pines, and has been in some years very destructive to the frames of houses in the southern parts of France; it may be destroyed by sulphurous and chlorine gases forced into the galleries. The *T. flavicollis* (Fabr.) has in like manner proved injurious to the olive trees in Spain. In the United States a representative species, the *T. frontalis* (Haldeman), has been noticed at Salem, Mass., where it did considerable mischief in greenhouses and graperies, not only attacking decaying and dead wood, but also excavating the roots of living vines and causing their destruction. (See "Proceedings of the Boston Society of Natural History," vol. vii. pp. 287, 288, May 2, 1860.)

TERN, the proper name of the birds of the gull family and sub-family *sternina*, among which is included the noddy, previously described. The terns have a rather long, usually slender, nearly straight, and sharp-pointed bill; wings elongated, with long and pointed primaries; tail long, and in most species forked; tarsi slender, anterior toes with a deeply notched web, hind toe small, and the claws curved and sharp. They are found on and near the sea shore, and sometimes on inland lakes and rivers, most of the time hovering with rapid and easy flight over sandy bars and shallows, darting suddenly upon the small fishes and crustaceans on which they principally feed; they are often seen swimming and resting on the water, but never diving; from their forked tail, small size, and swift and graceful flight, they are popularly called sea swallows.—In the typical genus *sterna* (Linn.) the upper mandible is slightly curved, with the frontal feathers extending to the nostrils; the outer quill is the longest. It contains more than 60 species, in both hemispheres, migrating in bands from place to place according to season; the eggs are 2 to 4, usually deposited in a slight hollow in the sand on rocks surrounded by the sea; the hatching is left mostly to the sun, the females sitting only at night and in cold weather; the young are carefully fed and bravely defended. The largest species is the Caspian tern (*S. Caspia*, Pall.), 21½ inches long, 51 in alar extent, with a very stout bill of 3 inches; the back and wings are pale bluish ash, the upper parts of the head black with a greenish gloss, the quill shafts and the under plumage pure white, the bill vermilion, and the legs and feet black; the tail is not much forked; the young are mottled above with blackish brown. It is found in the United States from the coast of New Jersey northward, and all over Europe, in the vicinity of the Caspian sea (where it was first found and described by Pallas), and also in Africa. The eggs, as in most of the terns, are yellowish stone-colored, with ash-gray and dark reddish brown spots; they are 2½ by 1¾ inches. The Cayenne or royal tern (*S. Cayana*, Bonap.) is 21 inches long and 49 in alar extent, with a deep red bill of 2¾ inches; the mantle is bluish gray, lower parts white, legs and feet black, and the tail forked. It is found on the Atlantic coast from Labrador to Florida, being abundant about the southern keys; it also occurs in California. It is a very shy bird, and utters loud and harsh cries during flight; when any are killed out of a flock, the rest dart toward the gunner, affording a fine chance for a second shot; when wounded they eject the contents of the stomach, and bite severely; the eggs are 2¾ by 1¾ inches, and like those of the other species afford good eating; the flesh is very oily. The marsh tern (*S. aranea*, Wils.)

is 18¾ inches long and 34 in alar extent; the bill is 1⅜ inches, and, with the head above, is black; mantle pale bluish gray; lower parts white; tail moderately forked. It is found on our coast as far north as Connecticut; it is a very powerful flier and a buoyant swimmer; the food consists principally of insects caught on the wing, as by the swallows; the eggs are 1¾ by 1 inch, olivaceous with dark blotches and dots. The old world representative of this species is the gull-billed tern (*S. Anglica*, Mont.), which is distributed over central Europe, and also in India and N. Africa; it is regarded as the same species as the marsh tern by most of the older ornithologists. The sooty tern (*S. fuliginosa*, Gmel.) is 16½ inches long and 35 in alar extent; bill 1¾ and black, as are the legs and feet; it is deep black above, the forehead and lower parts white; tail deeply forked, black, with the outer and basal half of the inner web of the outside feathers white. It is found in the gulf states from Texas to Florida, arriving from the south in May and departing by the beginning of August; it rarely alights on the water, where it would be incommoded by its long tail; it feeds principally on fish, which it seizes by a sweeping curve and not by the headlong plunge of most terns; it sometimes hovers over the water to pick up floating particles like the petrels; the cries are very loud when the breeding places are disturbed; the eggs are 3 in number, 2⅛ by 1⅝ inches, and afford delicious eating, and in former times were the source of a considerable trade with Havana. Wilson's tern (*S. Wilsoni*, Bonap.) is 15 inches long, with an alar extent of 32; the bill is 1¼, slender, coral red, black near the end with a yellow tip; mantle light grayish blue; upper part of head and neck deep black; beneath pearl gray; tail deeply forked, with the outer web of lateral feather blackish gray; legs and feet coral red. It is found from Texas to Labrador, and on the coast of Massachusetts goes by the name of mackerel gull, from the supposition that it announces the arrival of this fish in its summer quarters; it formerly bred on Egg Rock near Nahant, and 25 years ago was very abundant in summer on Nantasket beach; the eggs are 3 in number, 1¾ by 1¼ inches. Its European representative is the common sea swallow (*S. hirundo*, Linn.), spread over Europe and Africa; it is 14¼ inches long, and the eggs 1⅜ by 1⅛ inches. The arctic tern (*S. arctica*, Temm.) is 14½ inches long, and 32 in extent of wings; the bill 1⅛, slender, and deep carmine; mantle light grayish blue, and under parts plumbeous gray; tail very deeply forked; legs and feet crimson. It is found from the coast of New England to the arctic seas and the fur countries, also coming down to N. Europe; it is a very rapid and graceful flier, dashing boldly into the water after fish and shrimps; the eggs are delicious eating, 1¼ by ⅞ of an inch. The roseate tern (*S. paradisea*, Brünn.) is 16 inches long and 30 in alar extent; bill 1½, slender, brownish black, orange at the base; mantle pale bluish gray; under parts white with a roseate tinge; tail very deeply forked; legs and feet orange. It is found from Florida to New York, and also in Europe and Asia; it is noisy and restless; the roseate hue of the breast disappears soon after death; it breeds in Florida, in company with other species; the eggs are 1¾ by 1⅛ inches. The least or silvery tern (*S. frenata*, Gambel) is 8¾ inches long and 19 in alar extent; bill 1⅛, slender, pale orange red; mantle bluish gray; under parts silvery white; legs and feet like bill; tail forked. It is found from Texas to Labrador, and on the western rivers and great lakes. This delicate species seizes insects on the wing like the swallows and flycatchers, and feeds also on shrimps; it is the least shy of the terns, and utters a sharp and frequently repeated cry like the notes of the barn swallow when disturbed; the eggs are 1¼ by 1 inch. Its European representative is the *S. minuta* (Linn.). A common species in Europe is the Sandwich tern (*S. Boysii*, Lath., or *S. cantiaca*, Gmel.), 15 inches long; the bill black, with a yellowish white tip; the head above the eyes black, and the occipital feathers elongated; mantle ash-gray; under parts and tail white; legs and feet black. It is found throughout Europe, being a summer visitor in Great Britain, and migrating south into Africa; the eggs are 2 by 1½ inches, yellowish stone-colored, with ashy, orange, or deep red and brown variable markings. This species is represented in America by Cabot's tern (*S. acuflavida*, Cabot), found along the gulf states from Texas to Florida.—The short-tailed or black tern (*hydrochelidon plumbea*, Boie) is 9½ inches long and 24 in alar extent; the bill is 1⅛, strong, brownish black; head, neck, breast, sides, and abdomen black; lower tail coverts, shafts of first 4 primaries, and edge of bend of wing, white; back, wings, and tail dark plumbeous gray; legs and feet reddish brown. It is found from Texas to New England, in the fur countries, and on the Mississippi and its tributaries; it goes more inland than the other terns, and its food consists chiefly of neuropterous insects which it catches like a swallow; it also feeds upon the fry of fish and aquatic worms; the tail is not forked, but slightly notched; the nest is made in a tuft of flags or grass just above the surface of the water or on the floating leaves of aquatic plants; the eggs are 2 to 4, 1⅜ by 1 inch, and are constantly covered by each sex in turn. Its European representative is the *H. nigra* (Boie).

TERNAUX, Guillaume Louis, baron, a French manufacturer, born in Sedan, Oct. 8, 1763, died in St. Ouen, April 2, 1833. When scarcely 16 years old he was intrusted with the management of a woollen factory belonging to his father, and by it retrieved the fortune of his family. A supporter of reform in 1789, he was at the same time devoted to the king, and was one of his defenders in 1792. He emigrated in 1793, but returned on the fall of

Robespierre, and established large manufactories at Louviers and Sedan; and though he did not conceal his opposition to the consulate and the empire, Napoleon made him a member and officer of the legion of honor. He naturalized Thibetan goats in France, manufactured shawls in imitation of the Indian ones, which were styled *cachemires-Ternaux*, and made a series of interesting experiments as to the means of preserving corn in underground vaults. He was made a baron by Louis XVIII.; in 1818 he was elected a deputy by the 2d district of Paris; and being returned again in 1827, he was one of the 221 deputies who brought about the revolution of July, 1830. The commercial crisis which followed was a deadly blow to his prosperity, which had been already impaired in 1828 by the law taxing raw materials. He however paid all his debts, and died impoverished.—His nephew, Henri Ternaux, who has taken the additional name of Compans, is remarkable for his devotion to the study of American history. He has published 2 series, in 10 vols. each, of *Voyages, Relations et Mémoires*, from inedited Spanish MSS., relating to the discovery and conquest of America, and characterized by Mr. Prescott as "invaluable" (Paris, 1836–'40); *Bibliothèque Américaine*, 1493–1700 (8vo., Paris, 1837); *Bibliothèque Asiatique et Africaine* (1841–'2); and various other works.

TERNI (anc. *Interamna*), a walled town of central Italy, in the district of Spoleto, beautifully situated on an island formed by the river Nera, 49 m. N. by E. from Rome; pop. 9,245. It is the see of an archbishop, and the cathedral is a fine building with a magnificent altar. The place has many remains of antiquity, including some vaults of an amphitheatre constructed in the time of Tiberius, portions of temples of Sol and Cybele, and some parts of public baths. The surrounding country is exceedingly productive, and there are oil and flour mills on the river. Woollen and silk goods and leather are manufactured. About 5 m. from Terni are the celebrated falls of the Velino, known in the neighborhood by the name of Cascata del Marmore. They are artificial, having been constructed by the Romans, and the water is brought to them by a channel cut in order to drain the plains of Rieti. The height of the fall is nearly 840 feet, and the bed of the channel immediately above them about 50 feet. The water descends by 3 separate leaps, the first of 50, the second of about 550, and the third of 240 feet; the whole forming one continuous sheet of foam, said by Byron to be "worth all the cascades and torrents of Switzerland put together."

TERPANDER (Τερπανδρος), a Greek musician and poet, born at Antissa in the island of Lesbos, flourished in the earlier half of the 7th century B. C. He removed, early in life apparently, from Lesbos to Sparta, where in 676 he was crowned victor in the first musical contest at the feast of Apollo Carneius, and where he established the first musical school or system that existed in Greece. He enlarged the compass of the lyre from a tetrachord to an octave, but with the omission of the third string, making it really a heptachord; and he was the first who regularly set poetry to music. His nomes remained for a long period the standard melodies used at religious festivals, and his school long flourished at Sparta.

TERPSICHORE, one of the nine Muses, daughter of Jupiter and Mnemosyne. She presided over choral song and dancing, and is generally represented as crowned with flowers and holding a lyre and plectrum.

TERRA, or Tellus, a goddess of the Roman mythology, in whose form the earth was personified and worshipped, and who is thus often named in contrast with Jupiter, the god of heaven. A festival in her honor was celebrated on the 15th of April, and private sacrifices were offered to her at seedtime and harvest, and also when any member of a family died, as Terra was to receive the departed into her bosom. Terra corresponds to Gæa or Ge in Greek mythology. In the Hesiodic theogony Gæa was the first born of Chaos. She gave birth to Uranus, whom she afterward married, and from this union sprang the Titans, the Cyclops, and the hundred-handed giants. Her worship seems to have been universal among the Greeks, and the epithets applied to her have in all cases some reference to the earth as the all-sustaining and all-producing mother.

TERRA COTTA (It., baked clay), an earthenware, mention of which is made in the article Pottery, as having been produced by the ancient Egyptians and Greeks in the forms of vases, water jars, various ornamental figures, &c. The material selected for this ware is of clay of considerable purity, and the articles are generally slack-baked, sometimes merely hardened by continued exposure to the sun. The color is usually a red or buff, and the vases are often ornamented with designs of leaves, vines, &c., painted in black, and sometimes in other colors. While these adorn the rim, neck, and stand, the body is sometimes covered with allegorical representations of gods, men, and animals. The Romans appear to have employed finer materials for their terra cottas, and to have moulded these into lamps, urns, &c., which they ornamented by depressed or raised figures. From the 12th to the 17th century terra cotta was much used in Italy for architectural decorations, and Michel Angelo and other sculptors employed it for their models and clay sketches. The manufacture of decorative works in terra cotta became an important branch of industry in England in the latter part of the last century. The mixtures employed were of pure clays and fine quartz sand or calcined flints with pulverized potsherds or old pottery. The old coats of arms seen over many of the shop fronts in London were moulded and baked in this material. It was also used for statues, and decorative pieces of various forms were employed in different parts of buildings. The ware was much more firmly baked than that of the ancients. Of late years it has been employed for elaborate architectural ornaments, such as are ordinarily carved in stone, and also for architectural models. Drain tiles and similar ware are made of it.

TERRA DEL FUEGO, or TIERRA DEL FUEGO (Sp., "Land of Fire"), a group of islands which lie off the S. extremity of South America, between lat. 52° 40′ and 56° S. and long. 63° 40′ and 75° W. It is separated from the mainland by the long and intricate strait of Magellan, and has the Pacific ocean on the W. and the Atlantic on the E., while the E. and W. limits of these seas are supposed to meet at Cape Horn, its S. extremity. The group comprises numerous small islands, of which Cape Horn is the most remarkable; the large island of East Terra del Fuego or King Charles South Land, which is about 300 m. long E. and W. and 200 broad; the islands of Navarino and Hoste to the S., separated from the last named by the Beagle channel; and Clarence and Desolation islands to the W. All these islands are deeply indented by arms of the sea, and of very irregular shapes. They are mountainous, and many of the mountains are more than 5,000 feet high, while the highest summit reaches an elevation of about 7,000 feet. The limit of perpetual snow is about 4,000 feet. The soil is generally a swampy peat, and to the height of 1,500 feet is covered with stunted forests of beech. The geological formation is principally clay slate, greenstone, and granite. The climate is one of the worst in the world; storms, sudden gusts of wind, rain, snow, and mist constantly succeed each other. The sea weed called *fucus giganteus* is exceedingly abundant upon the coasts, and affords shelter for innumerable shell fish, without which the natives would find it extremely difficult to subsist. Deer, guanacos, foxes, sea otters, mice, and bats are the only animals found; but birds, particularly sea fowl, are numerous.—The natives of the N. E. part of Terra del Fuego bear a strong resemblance to the Patagonians, while those of the S. E. portion of the group are short, ill made, and ill looking. Their only clothing consists of guanaco or seal skin. They are filthy in their habits, and will eat any flesh however putrid. Their huts, generally built close to the sea shore in some sheltered spot, are of a conical shape, made of branches or small trees stuck in the earth, about 7 or 8 feet in diameter and 4 or 5 feet in height, with a small hole for a door.—Terra del Fuego was discovered by Magalhaens in 1520, and received its name from the numerous fires seen during the night along the shore.

TERRAPIN, a name commonly applied to several species of land tortoises, but in the United States generally limited to the few fresh water species of the family *emydoidæ*, extensively used as food. They have a depressed head, and the neck can be wholly retracted within the shell; eyes large, and the beak somewhat like that of a bird of prey; they are good swimmers, and out of the water move with more quickness than the land tortoises; their food consists of small reptiles, fish, and other aquatic animals, though in captivity they eat vegetables readily.—The yellow-bellied terrapin (*trachemys scabra*, Ag.; *emys serrata*, Daud.) is 12 inches long, 7½ wide, and about 11 high; the shell is rounded, very convex, notched in front, deeply serrated behind, wrinkled longitudinally, and rough all over. The color is blackish brown with yellow lines and marks more or less radiating; sternum yellowish, notched behind; snout short and pointed; upper jaw with a very slight notch; eyes large, with golden iris having a broad black stripe extending horizontally through it; fingers 5, each with a short strong nail, and toes 5, fully webbed, 4 only having nails; tail short, thick, and pointed; head and limbs black, varied with yellow lines, a broad transverse band of the latter across the neck behind the eyes. This species lives in stagnant ponds and pools, and is fond of basking in the sun on the margins and on stones and stumps, whence it can readily plunge into the water if disturbed; it is found from Virginia to Georgia, south of the latter being replaced by the Florida and north of the former by the red-bellied terrapin; it is abundant about Charleston, S. C., where it is seen in great numbers in the markets; the flesh is considered very good.—The red-bellied terrapin or potter (*ptychemys rugosa*, Ag.; *E. rubriventris*, Leconte) is 11 inches long, 7 wide, and about 5 high; the shell is entire in front, widest and notched behind; upper jaw deeply notched, and the lower serrated with 3 teeth in front; shell, head, neck, and limbs dusky brown, with blotches, spots, and lines of red; sternum dusky red. It lives in running waters, preferring a rocky bottom; it is found between the Delaware river and Chesapeake bay, and is abundant about Trenton, N. J.; it is common in the Philadelphia markets, but its flesh is less esteemed than that of the preceding and following species.—The Florida terrapin (*P. concinna*, Ag.; *E. Floridana*, Harlan) is the largest of the species, being 15 inches long, 10 wide, and 7½ high; the shell is entire, compressed on the sides; the jaws without teeth, the lower somewhat serrated; the shell, neck, head, and limbs brownish, with numerous yellow lines and bands; sternum pale yellow, the marginal plates with a black spot having a yellow centre; throat ashy, striped with yellow. It is extensively distributed through the southern states, in lakes and rivers, from North Carolina as far as western Louisiana, and up the Mississippi valley to Arkansas; it is very common in E. Florida, especially in the St. John's river; its flesh is delicious. An allied species, the Alabama terrapin (*P. Mobiliensis*, Ag.; *E. Mobiliensis*, Holbr.), is very large, measuring 15 inches in length, 9½ in width, and 6 in height; the shell is very high on the anterior part of the back, and somewhat serrated behind; jaws serrated, the lower hooked; sternum notched behind; above, on the head, neck, and limbs, dusky brown, with a network and longitudinal lines of yellow; sternum yellow, with a black blotch on each marginal plate. It is found in Alabama, Mississippi, Louisiana, Texas, and Mexico; it is abundant about Mobile, where its flesh is considered a great delicacy.—The chicken terrapin (*deirochelys reticulata*, Ag.; *E. reticulata*, Schweig.) is 9½ inches long and 5½ wide; the shell is oval, entire, longitudinally rough; upper jaw slightly notched, lower entire with a hook in front; neck very long; above, head, neck, and limbs dark brown, with numerous yellow lines communicating so as to form a network, whence the specific name; lower parts yellow, with black spots on some of the marginal plates. The habits are the same as in the other species, the long neck giving them in the water somewhat the appearance of a snake, as they swim with this part and the head alone visible above the surface. It is found from North Carolina to Georgia and Louisiana, not far from the sea coast; it is often brought to market, and is the most esteemed of the terrapins for food.—The salt water terrapin (*malacoclemmys palustris*, Ag.; *E. terrapin*, Holbr.) is 7½ inches long and 3 high; the shell is nearly entire, slightly notched posteriorly; the head is very large; jaws strong and cutting, the upper slightly notched and the lower hooked; eyes small with a gray iris; neck short and thick. The color is dusky olive green, with darker concentric lines; sternum generally yellowish with concentric dusky lines; side of the head, neck, and limbs brownish white with innumerable black dots; the males are the smallest and have deeper striæ. It lives in salt water and in salt marshes, where it hibernates; it is very shy, a rapid swimmer, and a quick runner on land; it is found from Rhode Island to Florida, along the gulf of Mexico, in South America, and perhaps in the West Indies; it is abundant about Charleston, S. C., and great numbers are taken when the female is about to lay her eggs in spring and early summer; the flesh is excellent, and in the middle states most esteemed during the period of hibernation.

TERRE BONNE, a S. E. parish of Louisiana, bordering on the gulf of Mexico, and drained by the Terre Bonne, Black, and Caillon bayous; area, 1,640 sq. m.; pop. in 1860, 12,090, of whom 6,784 were slaves. The surface is flat and marshy, and diversified by numerous shallow lakes. The productions in 1850 were 187,420 bushels of Indian corn, 9,171 hogsheads of sugar, 485,200 gallons of molasses, and 466,900 lbs. of rice. There were 3 churches, and 270 pupils attending public schools. The New Orleans and Opelousas railroad intersects the north part of the county. Capital, Houmas.

TERRE HAUTE, a city and the capital of Vigo co., Ind., on the E. bank of the Wabash river, 78 m. W. S. W. from Indianapolis, and 69 m. N. from Vincennes; pop. in 1850, 4,051; in 1860, 8,594. It is beautifully situated on an elevated plateau, is well built, and has broad streets tastefully ornamented with shade trees. It is the centre of trade for a rich and populous region. It has a number of manufacturing establishments of various kinds, among which are railroad machine shops for repairing and constructing cars. Its trade is chiefly in produce and pork; the average number of hogs slaughtered per annum for 10 years ending with 1857 was over 66,000. The Terre Haute, Alton, and St. Louis railroad connects it with St. Louis; the Terre Haute and Richmond railroad with Indianapolis; and the Evansville, Vincennes, and Terre Haute railroad with the Ohio river; and it is connected with Lake Erie by the Wabash and Erie canal. The Wabash river is navigable a portion of the year for steamboats, and shipments are made direct to and from points on the Ohio and Mississippi rivers. The national road and other excellent roads intersect the county. Terre Haute has a handsome court house and other public buildings, 3 banks with a capital of $500,000, 4 fine public school buildings, several private schools, St. Vincent's academy for girls, under the supervision of the sisters of Providence of St. Mary's, a female college, and 13 churches, viz.: 3 Methodist, 2 Presbyterian, and 1 each Baptist, Christian, Congregational, Episcopal, German Methodist, German Reformed, Roman Catholic, and Universalist. There are 3 daily and 3 weekly newspapers, and 2 public libraries. An abundance of bituminous coal is found near the city. Terre Haute was laid out in 1816.

TERRELL, a new S. W. co. of Georgia, drained by affluents of Flint river; area, about 300 sq. m.; pop. in 1860, 6,237, of whom 2,892 were slaves. Capital, Dawson.

TERRESTRIAL MAGNETISM. See MAGNETISM, TERRESTRIAL.

TERRIER (*canis terrarius*, Flem.), a small variety of domesticated dog, so named from its propensity to pursue and attack its prey in subterranean retreats. It is considered by Hamilton Smith as descended from an indigenous European canine, and certainly combines the innate courage, sagacity, and external peculiarities perpetuated without care in breeding, which indicate a primitive stock. The terrier in England, if not indigenous, was very early introduced by the primitive inhabitants; even a considerable mixture with other breeds does not impair its boldness, hardiness, fidelity, vivacity, and vermin-hunting propensities. There are two well marked varieties, the result of fancy or accident. One is smooth, rounded, elegant in shape, usually black, with tan spots over the eyes and the same tint on the legs and lower parts; it is occasionally white; the nose is sharp, eyes bright, ears pointed or slightly turned down, and the tail carried high and bowed over the back. The other, the Scotch terrier, the oldest and purest breed, has shaggy and wiry hair, a shorter and fuller muzzle, bearded snout and face, stouter limbs, less elegant form, and a pale sandy or ochrey color; it is sometimes white. The isle of Skye breed is one of the most prized, and one of the ugliest. The terrier has an acute sense of smell, and is a good attendant on a pack of hounds, forcing foxes and other game from their coverts and dens; it is a determined enemy of the weasel, badger, and rat families, and is therefore very useful about the house and farm; its boldness is very great, and it has been noticed in India that, when even the bulldog pauses, the English terrier does not hesitate to attack the larger carnivora and worry them from their hiding places; the jaws are very powerful, one bite sufficing to kill a rat. The Scotch terrier has been known to kill 100 rats in a room in less than 7 minutes. In England the terrier blood is visible in most of the sheep and cattle dogs; but the most prized variety is the bull terrier, from a cross with the bulldog, the most determined, pugnacious, and savage of the dog tribe; it is this which affords material for the dog fights so attractive to the lower orders of large cities, in which neither combatant surrenders while life remains, and in which the most frightful wounds are received without a groan; in this the ears are pointed, and the general characters are those of the bulldog; it is usually white, with some black about the head. There is a large and rough breed in Germany, probably a cross with a large shepherd's dog, bold, strong, and noisy, used to arouse wild boars and other fierce beasts, and bring them within reach of the hunters; it is of a wolf-gray color, whitish about the head and breast, with a well fringed tail curled over the back. —The turnspit is a cross of the terrier with larger and less pure breeds; the body is long and heavy, with disproportionately short and generally crooked legs; it is bold, vigilant, and spirited, and, though of larger size, is used in Europe for the purposes of the terrier; it is, when best, a cross with a hound; it received its name from its being in old times employed to turn the spit in the kitchen, walking round in a kind of wheel. The *C. vertagus* of the ancients, sometimes erroneously translated turnspit, is the lurcher, a degenerate greyhound.

TERTIARIANS (Lat. *tertiarius*, containing a third part), a name denoting side branches of a number of religious orders in the Roman Catholic church, whose members do not live in common in cloisters and convents, but bind themselves by simple vows to the observance of certain prayers and exercises of the order. Such an organization of secular persons occurs for the first time in the history of the Premonstratenses, and another was connected with the order of the Templars. But it did not become generally known until Francis of Assisi, after founding the order of the Franciscans (the first order) and the order of the Poor Clares (second order), founded a third one for the numerous laymen who wished to conform themselves to the mode of life of the Franciscans as much as secular occupations would permit. When their number increased, many of them resolved to adopt the common life, and thus the third regular order of Franciscans arose, which afterward divided itself into several congregations. (See Franciscans, vol. vii. p. 698.) The example of the Franciscans was followed by the Dominicans, Augustines, Carmelites, Servites, and other orders, all which have connected with them both Tertiarians living in the world, and regular Tertiarians living in common.

TERTULLIAN (Quintus Septimius Florens Tertullianus), one of the early church fathers, born in Carthage about A. D. 160, died between 220 and 240. He was the son of a Roman centurion, became a lawyer, embraced Christianity and entered the Christian priesthood at a mature age, preached at Carthage and probably at Rome, and became widely known for his fondness for controversy as well as his ascetic practices. About the year 202 he joined the Montanists, attracted by their rigid morality and contempt of earthly pleasures, and their opposition to the increasing worldliness of the church, and at once became the leading defender and champion of the sect, with which he remained until his death.—The works of Tertullian are numerous and of great importance. The difference between those written before and those after he became a Montanist, seems to be more a difference of spirit than of doctrine; and his writings are classed in authority with those of the other church fathers. His *Apologeticus* has been called the first plea for religious liberty in Christian literature. Of his controversial works may be mentioned his books "Against the Gentiles," "Against the Jews," "Against Hermogenes" (showing that matter is not eternal, but created by God), "Against the Valentinians," "On the Prescription of Heretics" (asserting vehemently that no doctrine contrary to the received faith had a claim to gentle treatment or to appeal to the Scriptures, and contradicting the principles of his "Apology"), "Against Marcion," "Against Praxeas," "On the Soul," "On Baptism," "On the Flesh of Christ," and "On the Resurrection of the Body," in all of which he opposes growing errors, and seeks to show what is the true doctrine of the church. Among his practical works belong the book "On Penance;" that "On Prayer," which explains the Lord's prayer, and mentions the ceremonies proper for that practice; "On Patience," which he passionately and intemperately commends; "To the Martyrs," a pathetic appeal and encouragement; "On Theatrical Shows;" "On Idolatry," a casuistical discussion of the degree to which idol worship may be tolerated by Christians; "On the Dress of Women," and on the "Veiling of Virgins," which teach that modesty and the hiding of the features are proper for women in the house of God; and the book to his "Wife," in which he proclaims his aversion to second marriages. His specially Montanist works are the "Exhortation to Chastity" and "On Monogamy," in which he carries to absolute prohibition the theory of the book to his "Wife;" "On Chastity," which denies that those who are guilty of gross sins can be absolved; "On Repentance;" "On Fasting," explaining the obligation of the new fasts required by Montanism, and the method of keeping them; "On the Soldier's Crown," which praises a Christian soldier for refusing to wear a garland, when Christ was crowned with thorns; and "On Flight," which insists that Christians ought not to flee from persecutions. Tertullian's works are written in a rude Punic Latin interlarded with African idioms and phrases of corrupted Greek. His earlier works are said to have been written in Greek, but have come down only in Latin translations. The style of all is nervous, abrupt, confused, and vehement. The first collected edition of them is that by Beatus Rhenanus (fol., Basel, 1521). Among the numerous later editions are those by Semler (6 vols., Halle, 1770-'73), Leopold in Gersdorf's *Bibliotheca Patrum Latinorum* (vols. iv. to vii., Leipsic, 1839-'41), Migné (Paris, 1844), and Oehler (3 vols., Leipsic, 1853). Translations of several, especially of the "Apology," have been published in most of the modern European languages. The life of Tertullian has been often written—by Jerome in the early church, and in modern times by Neander (*Antignosticus*, Berlin, 1825) and Hesselberg (Dorpat, 1848). His doctrine and influence are well discussed in the special works on Montanism by Wernsdorf (1751), Münter (1829), Schwegler (1841), and Baur (1851).

TERUEL, a N. E. province of Spain, in Aragon, bounded N. by Saragossa and Huesca, E. and S. by Tarragona, Castellon de la Plana, and Valencia, and W. by Cuenca and Guadalajara; area, 2,950 sq. m.; pop. in 1857, 238,628. The Albarracin mountains traverse it in an E. and W. direction, sending off numerous spurs on both sides. Muela de San Juan, one of the principal summits of the main range, is covered with snow during the greater part of the year, and the rivers Tagus, Cabriel, Guadalaviar, and Jucar have their sources on its sides. The province is well watered by the Guadalupe and the Jiloca, affluents of the Ebro, which bounds it on the N., the Guadalaviar, and numerous smaller streams. Between the mountains there are extensive plains of great fertility, which produce grain, wine, oil, silk, hemp, flax, saffron, and fruit. Coarse woollen goods, linen, canvas, leather, paper, and earthenware are manufactured.—Teruel (anc. *Turba*), the capital, is situated on the left bank of the Guadalaviar, 142 m. N. E. from Madrid; pop. 7,165. It stands on elevated ground, is surrounded by old walls, and entered by 9 gates surmounted by Aragonese towers. There is a bull ring outside the town capable of accommodating 9,000 spectators.

TESSIN. See Ticino.

TESTAMENT. See Will.

TESTAMENT, Old and New. See Bible.

TESTIMONY. See Evidence.

TESTUDINATA, a term employed by Klein, and adopted by Agassiz, synonymous with chelonians, and embracing the reptiles known as tortoises and turtles. They are the highest of the class, approaching the lower or aquatic birds in form, mode of existence, and in some points of structure; the regions of the body are distinctly marked, and the head acquires a considerable mobility on the neck. Straus-Durckheim regards the testudinata as a distinct class, higher than, and not an order among, reptiles; a view which cannot be sustained, as both are built up in the same way as to structure of skeleton, nervous system, organs of sense, locomotion, and digestion, and have an identical mode of development; the only differences are the ordinal ones of complication of structure. Duméril and Bibron divide the order into 4 families according to the habitat, as follows: *thalassites* or marine turtles; *potamites* or river tortoises; *elodites* or marsh tortoises, with the sub-families *cryptodères* (which bend the short neck like the letter Z, and conceal the head on the median line beneath the carapace), and *pleurodères* (which curve the long neck horizontally and on the side of the body under the shell); and *chersites* or land tortoises, the last named being the highest in rank. Agassiz ("Contributions to the Natural History of the United States of America," vol. i. part 2) adopts Oppel's subdivision of the order, making the sub-orders: I., *chelonii*, with the families: 1, *chelonioidæ* (marine turtles), and 2, *sphargididæ* (leather or trunk turtles); and II., *amydæ*, with the families: 3, *trionychidæ* (soft-shelled tortoises); 4, *chelyoidæ* (*matamata*); 5, *hydraspididæ* (like *platemys* and other flattened species, mostly South American), united by J. E. Gray to the preceding family; 6, *chelydroidæ* (snapping turtles); 7, *cinosternoidæ* (mud turtles); 8, *emydoidæ* (fresh water species like the terrapins); and 9, *testudinina* (land tortoises like the great Galapagos, gopher, and common European tortoises). The characters of the sub-orders with their families will be given under Tortoise and Turtle, which may be considered as corresponding sufficiently well to the *amydæ* and *chelonii* of Oppel. The skeleton is in great part external, their bony box being covered only by comparatively thin scales or a naked skin; the most striking character is the stiff vertebral column, spreading in the shape of a carapace or shield, connected by a lateral bridge with the plastron or ventral plate, between which the organs of the trunk are enclosed, and having an anterior and a posterior opening for the protrusion of the head, limbs, and tail, which are all free; locomotion is always performed by the 4 limbs. The shield consists of a hard and dry epidermic covering, under which is a bony plate made up of the vertebræ, ribs, and sternum, overlaid and the intervals filled with the ossified skin or dermal skeleton, divided into many pieces united by suture; in the marine turtles this dermal skeleton is imperfect (especially below), less developed in the trionyx, and least of all in the trunk turtle (*sphargis*). The epidermic plates in the tortoise-shell turtle grow only on the anterior edge, the older parts moving backward, much as in the human nail; but in the land tortoises they increase below and on all sides, in concentric rings, like the annual growths of a tree; there is every intermediate stage between these types; a moulting of the epidermis takes place in all chelonians, scale by scale. In all except the imbricated turtle the colors are situated in the lowest layers of the epidermis; in this they exist in the external dry horny layers, displaying the beautiful and permanent hues of tortoise shell; the variation of color is very great in many species; in the corium or true skin is deposited the phosphate of lime of the dermal skeleton. The skull is solid and compact, and the facial bones are immovably fixed to the cranium; the lower jaw consists of a firm bony arch; the occipital bone strikingly resembles a vertebra, the parietals principally enclose the brain, there are 2 pairs of frontals, and the nasals are almost always wanting. The cervical vertebræ are 9, if the odontoid process be considered a distinct one, and have no transverse processes; some have a concave-convex articulation, others a convex-concave, one a biconcave (toward the lower part of the series), and one a biconvex (in the middle), giving considerable freedom of motion in certain directions without the flexibility of the bird's neck. The dorsal vertebræ are 11, of which the first is movable, the rest united into a firm arch by the continuous growth of the spinous processes; the ribs extend from between the vertebræ, being strongest where the dermal skeleton is least developed, as in *trionyx*, *sphargis*, &c.; the sternum consists of 4 pairs and one odd bone, varying much in size and connection, united to the ribs by a bony bridge, the marginal plates being dermal bones; the caudal vertebræ are very movable, convex behind, concave before, and without spinous processes. The scapular and pelvic arches are withdrawn under the bony roof of the body; the bones of the shoulder are long, straight, and narrow, the scapula and acromion united at right angles, the coracoid running backward among the muscles, and the 3 united to form the glenoid cavity; the humerus is short, crooked, and turned inward; the forearm and hand have their transverse diameter vertical, the ulna overlying the radius, so that the limb may be drawn back under the carapace by the bending of all the joints in the plane of the scapula; the form of the hand varies in the different families, according as it is used for terrestrial or aquatic locomotion. The pelvic arch is formed by 3 permanently distinct bones, which meet in the cotyloid cavity; the bones of the hind legs are like those of the anterior, but the femur is straighter than the humerus; there are great differences in the relative size of the 2 pairs of legs in the 2 sub-orders. The cervical muscles are largely developed for the purpose of darting forward and retracting the neck; the muscles of the limbs are much like those of mammals. The cerebral hemispheres are hollow and larger in proportion than in other reptiles, with a generally smooth surface; as in other reptiles the trigeminus is the largest nerve, but in these the par vagum is relatively larger than in the others; the 2 swellings of the spinal cord from which the nerves of the limbs arise are characteristically large. There is no movable external ear as in the crocodiles, but a tympanic cavity and membrane, the former divided into 2 parts by a bony partition; the eyes are larger and more movable than in the lower reptiles, similar to those of birds in the lids, nictitating membrane, osseous framework of cornea, and round pupil; a lachrymal gland is present. Hearing and vision are acute, but smell is dull, the nostrils being used chiefly for their slow respiration; they chew their food, and the tongue is broad, thick, and fleshy, with an acute sense of touch, perhaps approaching a sense of taste; the tongue is of use also in the respiratory process, as they swallow air into the lungs. The upper jaw always shuts over the lower, and both are covered with a peculiar horny sheath; the intestines, as in the higher classes, are longest in the herbivorous families, but the proportions of the different parts vary much without any special reference to the food; they are 9 times the length of the shield in the omnivorous red-bellied terrapin, and only 4½ in the carnivorous soft-shelled trionyx; the liver and gall bladder are large; spleen and pancreas always present, the former solid and generally attached to the latter, and this to the duodenum; the pancreas is lobular and irregular, and much the largest in the carnivorous feeders; digestion is performed very slowly, and hunger can be endured a long time. Respiration is effected by swallowing air, on account of the immobility of the thoracic cavity, assisted, according to Agassiz, by the diaphragm, which is well developed in the order, and by the scapular and pelvic muscles; the lungs are voluminous, most so in the land tortoises; the trionyx can remain half an hour or more under water, aëration of the blood in this and other aquatic species being doubtless partly effected, as in frogs, through the naked skin; many species have the power of emitting vocal sounds, independent of the sharp hiss which they all produce; respiration is reduced or entirely suspended in the hibernating species, according to the degree of this state. The heart is just above the liver, between its halves; the ventricle is single, divided into 2 cavities by an imperfect partition, and gives rise both to the 2 aortæ and the pulmonary artery; it beats about 10 times a minute; the lymphatic system is greatly developed, 2 hearts near the base of the tail sending the lymph over the body. The kidneys are comparatively small, flattened and lobed, in the pelvic cavity, outside the peritoneum; the ureters short, and bladder large; the ovaries are much like those of birds, and the number of eggs matured in a year varies in different members of the order; the cloaca is very large in both sexes; all are oviparous, and the eggs are spherical, covered with a hard shell, and laid in moist or dry ground or hot sand, the number varying from 4 or 5 in the land tortoises to more than 100 in the marine turtles; the young, which appear from the egg in from 6 weeks to 4 months or more, are generally very different in form from the parents; there is a hard tubercle on the snout of the young for breaking through the shell of the egg. The growth is very slow, and they attain the period of puberty the latest of all reptiles; very tenacious of life, they can exist a long time without nourishment, and give signs of vitality, according to Redi's experiments, 23 days after decapitation, so great is the irritability of the muscles; the same experimenter ascertained that a land tortoise lived for 6 months, blindly groping about, after the brain had been entirely removed; they attain a great age, even more than a century. They are most abundant in the warm regions of the earth, and the land tortoises especially in Africa, and subsist chiefly on vegetable substances, though many aquatic species are highly carnivorous. The marine turtles are herbivorous, shy, sluggish, and inoffensive; the trionyces active, savage biters, preying on fresh water shells and aquatic larvæ; the snappers attack larger prey, and are very ferocious; the mud turtles are carnivorous, active, but not savage; the fresh water species omnivorous, timid, and inoffensive; and the land tortoises herbivorous, slow, and gentle. Genera among chelonians contain comparatively few species. Their flesh and eggs are delicious, and the shell of the hawk's-bill turtle is an important article of commerce; their flesh, blood, and bile, and the ashes of the shell, entered largely into the pharmacopœia of the ancients, and were highly prized in various diseases. According to classic mythology, the tortoise was imprisoned in its bony box for having preferred to remain at home when the animals were invited by Jupiter to celebrate his marriage with Juno; fond of and secure at home, it was condemned to carry its house with it wherever it went; the ancients accordingly made it the emblem of the domesticity and silence which they considered becoming in their wives and daughters, by whom its image in various substances was worn as an ornament; Apelles painted and Phidias carved it under the feet of the goddess Venus, by whom they represented all that was amiable, beautiful, and modest in the female sex.—Chelonians first appeared on earth in the oolitic period, according to Agassiz, when neither genuine birds nor mammals existed; the so called tortoise footprints in the new red sandstone and devonian strata were undoubtedly made by crustaceans or other articulates; according to Pictet, impressions of their shields first occur in the Jura limestone and the Stonesfield oolite, and the 4 types of Duméril and Bibron together; they also are found in the tertiary and diluvial deposits. In the diluvium of the Sivalik hills of the Himalaya range have been found the remains of a gigantic chelonian (*colossochelys atlas*, Cautl. and Falc.), which must have been 18 to 20 feet in length; it would seem that its existence was known to the natives, as this figure enters largely into the old East Indian cosmogonies. In geological times chelonians existed in northern regions of Europe and Asia, now too cold for them; marine and fresh water species also are often found together, a fact explained by estuary deposits, a more uniform constitution of the early waters of the globe, and a mixture by sudden inundations and surface changes. The present geographical range of chelonians is less extensive than in the other orders of reptiles, the marine turtles having the greatest and the terrestrial species the least; the marine species are also the largest with the exception of the Galapagos tortoise. Prof. Agassiz makes 2 faunæ of marine turtles, one of the Atlantic, the other of the Pacific and Indian oceans, the same 4 genera existing in each, the only differences being specific. He makes 5 North American chelonian faunæ, each having characteristic species: 1, the northeastern, from the 45th isotherm, going through Nova Scotia, New Brunswick, and Canada West as far as Lake Erie on the west, and south to North Carolina and Georgia; 2, the western, from western Pennsylvania to the dry plains at the foot of the E. slope of the Rocky mountains, north almost to Lake Superior, and south to Tennessee and Arkansas; 3, the southern, from the Atlantic coast of North Carolina southward to the gulf of Mexico, and west to Texas and Arkansas; 4, the Mexican; and 5, the Californian fauna. Chelonians are scarce on the western coast of North America, as on that of western Europe; there are none on the table land between the Sierra Nevada of California and the Rocky mountains, and the eastern slope of the latter to the great American desert; in the Alleghanies many species ascend to a height of several thousand feet, as the Virginia tortoise and the common snapper.

TETANUS, a spasmodic disease characterized by painful, involuntary, and protracted contraction of a greater or smaller number of the voluntary muscles. As seen in temperate climates, the disease is almost invariably consequent upon a wound or injury; but in particular localities and in hot climates, it may supervene without any lesion either external or internal. In a certain number of cases, the disease commences with chills and a feeling of depression and debility, with vertigo and sleeplessness. At first there is commonly a feeling of stiffness and uneasiness about the muscles of the neck and jaws. The patient thinks he has taken cold or has a slight rheumatic affection. He finds he is unable to separate the jaws to any distance, and more or less gradually they close, so that he is unable to open the mouth at all. This constitutes tetanus or locked jaw, and gives rise to the common name of the disease. As the disease advances there is acute pain at the bottom of the stomach, extending through toward the back; and this pain, like the contractions of the voluntary muscles, is aggravated in paroxysms. Gradually the large muscles of the trunk and extremities become affected. In some cases all the muscles are firmly contracted, and the body remains stiff and straight; if a limb is raised, the trunk is raised with it. Ordinarily the strong extensors of the trunk and limbs are more affected than the flexor muscles, or their superior power overcomes the resistance of these latter, and during the paroxysm the body is forcibly curved backward, the patient resting upon his hands and heels only. This constitutes *opisthotonos*. Occasionally, though it must be very rarely, the body is bent forward, constituting *emprosthotonos;* and still more rarely there is lateral curvature, forming *pleurosthotonos*. The muscles concerned in deglutition are early affected, so that swallowing is rendered difficult or impossible. Later in the course of the disease spasms of the muscles of the face occur. When this is the case, the brow is knit, the eyes wide open, fixed and staring, the nostrils distended, and the angles of the mouth drawn back, exposing the clenched teeth; this frightful contortion is the *risus sardonicus*. When the disease has once set in, the muscles affected are rarely at any time afterward wholly relaxed, almost always some degree of tension and spasm constantly remaining; at intervals more or less closely approximated to each other according to the severity of the disease, paroxysms occur during which the spasm is aggravated, the muscles affected becoming tense and hard as boards. During these paroxysms the patient commonly suffers from intense pain in the muscles affected, and, as was before stated, the substernal pain, dependent probably on spasm of the diaphragm, is likewise aggravated. So violent are the spasms that cases have occurred in which the teeth have been broken, bones fractured, or muscles torn across. The spasms come on even when the patient is perfectly at rest; but they are evidently excited by the slightest attempt at voluntary motion, by efforts at deglutition, or by mental emotion. The patient's mind is commonly unaffected throughout the disease; the bowels are apt to be obstinately constipated, and when evacuations are obtained they are offensive and unnatural; the breathing and pulse are quickened, and during the paroxysms the patient breaks out into a sweat. Toward the termination of the disease, the pulse is exceedingly small and frequent and the sweat cold and clammy. Death may occur either suddenly during a paroxysm or from suffocation, the muscles of respiration becoming fixed and the spasm in some instances probably affecting the glottis. In other cases death occurs from exhaustion, the patient being worn out by pain, sleeplessness, and want of nourishment.—Tetanus is an exceedingly fatal disease, death taking place in the large majority of cases. Post-mortem examination throws no light on its pathology. In cases arising from wounds, the nerve leading from the wound shows evidences of inflammation, being commonly red and swollen; but with this exception no lesions have been found which are constantly connected with the disease. As was before stated, tetanus is either idiopathic or traumatic. Idiopathic tetanus, rare in temperate, is not uncommon in hot climates; but though heat acts as a predisposing cause, the exciting cause is generally exposure to damp and cold. Some other conditions beside mere temperature, however, must have an influence in the production of the disease, since it is well known that in a part of Suffolk county, Long island, it appears to be almost endemic, and wounds and injuries are exceedingly apt to be followed by its development. In traumatic tetanus, exposure to cold, particularly when the body is debilitated by the previous occurrence of warm weather, would seem to be an efficient cause of the disease. Thus the wounded in the battle of Dresden, who were exposed to cold and wet just after the battle, while the previous weather had been hot and oppressive, suffered severely from tetanus; and after the battle of Bautzen, where the wounded lay on the field exposed to cold and rain during the night, Larrey found more than 100 attacked with tetanus the next morning. It would seem that tetanus is more liable to follow punctured and lacerated than incised wounds, and that wounds of the palmar surface of the feet and hands, most abundantly supplied with nerves, are particularly dangerous; but it may follow wounds of every character; even those made by the knife of the surgeon and the stroke of a whip, the cutting of a corn and extraction of a tooth, have all been followed by this formidable and fatal disease. Cases are on record in which lying-in women have been seized by the disease; and the writer has seen an instance in which a healing ulcer, caused by a slough occurring in the course of typhoid fever, appeared to have been the cause of a fatal attack. The time which elapses between the reception of the injury and the period of invasion of the disease varies very much in different cases. Larrey states that during the campaign in Egypt it rarely appeared before the 5th or after the 15th day; yet some cases are on record in which it came on in a few hours, and others in which it was delayed for more than a month.—As we have seen, the prognosis in tetanus is generally unfavorable. When the paroxysms come on suddenly, recur at short intervals, and increase in violence, treatment is rarely of any avail; death in such cases occurs often as early as the 2d, and is rarely delayed beyond the 5th day. When the attack is less violent and the interval between the paroxysms longer, the prospects of the patient are better, and if life is protracted beyond the 10th day he will frequently recover. The treatment of tetanus is an unsatisfactory subject. The severer cases die under every kind of treatment, and the milder have recovered under a variety of remedies. The inhalation of chloroform has been strongly recommended, and where it is well borne, it mitigates greatly the sufferings of the patient. Opium has been given in large and repeated doses; when recourse is had to it, it should be administered in a liquid form, or some salt of morphia should be used. A strong solution of the sulphate of morphia might be given by subcutaneous injection. Wine and distilled spirits, with or without opium, have been given in large quantities, and in many cases apparently with benefit. The bowels should be occasionally moved by active purgatives. Nux vomica and strychnine are the strictly homœopathic remedies; while conium and its alkaloid conide are the most perfectly antagonistic medicines, for they cause a rapidly increasing paralysis, first of the voluntary muscles, then of the respiratory muscles of the chest and abdomen, and finally paralysis of the spinal marrow, as Van Praag calls it.

TETRACHORD (Gr. τετρα, four, and χορδη, a string), in ancient music, a concord, consisting of 3 degrees or intervals and 4 terms or sounds, of which the highest is a perfect fourth to the lowest. Hence in modern music it is commonly called a fourth. The Greek lyre of 4 strings was frequently called a tetrachord.

TETZEL, or Tezel, Johann, a Dominican monk and preacher of indulgences, born in Leipsic (not at Pirna, as is stated by some writers) between 1450 and 1460, died there in July, 1519. He studied theology and philosophy at the university of Leipsic, and in 1489 entered the order of Dominicans. He gained some celebrity as a popular preacher, and therefore was repeatedly engaged to preach indulgences which the pope had granted for raising money for religious purposes. The early Protestant biographers of Tetzel say that he sold certificates of indulgences without requiring previous confession, and indulgences for future sins; that he led a very immoral life, and was even convicted at Innspruck of adultery; but Catholic historians have generally qualified these statements as gross exaggerations, though they admit that he often offered the indulgences in an offensive and mountebank way. In 1516 Tetzel commenced the publication of an indulgence designed to procure means for the construction of St. Peter's at Rome, receiving at the same time an appointment as inquisitor. Never before had the preaching of an indulgence produced such a commotion. He is said to have assured the people that as soon as the money resounded in the chest the sins would be forgiven, and the souls of the departed received into heaven; but Catholics, on the other hand, maintain that this is conclusively refuted by the *Instructio Summaria Sacerdotum ad Prædicandas Indulgentias*, prepared by Tetzel in 1517, in which he makes the gaining of an indulgence expressly dependent upon repentance and confession. As a delegate of the highest ecclesiastical authorities, Tetzel was generally received with great pomp, but at the same time met with a powerful and rapidly increasing opposition. On Oct. 31, 1517, Luther posted the celebrated 95 theses against the abuses in preaching indulgences on the door of the church in Wittenberg. Tetzel publicly burned the theses at Jüterbogk, and in Jan. 1518, defended in a public disputation at the university of Frankfort-on-the-Oder a number of antitheses. The students of Wittenberg, in their turn, burned 800 copies of the antitheses of Tetzel. Tetzel replied once more, in May, 1518, by a refutation of the sermon of Luther on indulgences and grace, but seems to have had no longer any influence on public opinion. The new papal nuncio Miltitz, who hoped to gain Luther back by a spirit of conciliation, reprimanded Tetzel severely, and threatened him with the wrath of the pope. So many reverses of fortune accelerated the death of Tetzel. Among the latest biographers of Tetzel are Hoffmann, a Protestant (*Lebensbeschreibung von Tetzel*, Leipsic, 1844), and Gröne, a Roman Catholic (Paderborn, 1858).

TEUCER (Gr. Τευκρος). I. The first king of Troy, son of the river god Scamander, by the nymph Idæa, after whom the Trojans are sometimes called Teucrians. II. A Grecian hero in the war against Troy, the son of Telamon, king of Salamis, and Hesione of Crete, and a stepbrother of Ajax. He was the best archer among the Greeks; but on his return from Troy his father refused to receive him in Salamis because he had not avenged the death of Ajax nor brought back his body. He therefore settled in the island of Cyprus, and founded there the city of Salamis.

TEUTONIC KNIGHTS, Order of, a powerful military order which originated during the crusades. During the siege of Acre in 1189 the sufferings of the soldiers were so great, that a charitable society for the care of the sick and wounded was instituted by citizens of Bremen and Lübeck. This was raised by Frederic Barbarossa to an order of knighthood, the rule of which was similar to that of the templars. None could be members but men of noble rank. The dress was black with a white mantle upon which was a black cross with a silver edging. The order had an elective grand master, who first dwelt at Jerusalem, then when Palestine fell into the hands of the Turks at Venice, and from 1297 at Marburg. They were dedicated to the service of the Virgin Mary, and the knights also called themselves "Brethren of the German House of our Lady of Jerusalem." Called to the work of evangelizing the heathen Prussians by force of arms, the order laid early in the 13th century the foundation of its future greatness by the acquisition of Culm. From this point they extended their conquests over the duchies of Prussia, Courland, and Livonia, exterminating the pagan inhabitants with fire and sword. In 1309 the grand master fixed his seat at Marienburg. Possessing the richest and most commercial provinces of the north, the order became exceedingly powerful; and at the beginning of the 15th century, when it had reached its greatest prosperity, its territory extended from the Oder to the gulf of Finland, and its yearly revenue was estimated at 800,000 marks. Nobles from all parts of Europe flocked to its banner, and Henry IV. of England, when earl of Derby, fought under it in 1390. Internal dissensions, luxury, and unjust and oppressive acts threatened its decline from this period, and a conflict with the Polish kings hastened it. In the battle of Grünwald or Tannenberg in 1410 they were totally defeated by Ladislas Jagiello; and after a subsequent long war with Casimir IV., West Prussia was given up to Poland, and for East Prussia they were compelled to do homage. A war to regain their independence deprived them of East Prussia, which in 1525 was presented by Sigismund I. of Poland to the grand master, the margrave Albert of Brandenburg, as a hereditary duchy. The order was now reduced to a mere shadow of its former greatness. In 1527 the grand master fixed his seat at Mergentheim in Swabia, became a spiritual prince of the German empire, and had under him 11 provinces divided into commanderies, comprising 850 square miles with 88,000 inhabitants. In 1805 the peace of Presburg gave to the emperor of Austria the rights, revenues, and possessions of grand master of the Teutonic order; but in the campaign of 1809 Napoleon while at Ratisbon abolished the order on April 24, its widely scattered territory falling to the princes in whose dominions it was.

TEUTONS (Lat. *Teutones* or *Teutoni*), a powerful people of ancient Germany, who probably dwelt on the southern shores of the Baltic, in the vicinity of the Cimbri, together with whom they invaded the dominions of the Roman republic at the close of the 2d century B. C., when they were annihilated by Marius. (See CIMBRI.) The name Teutons is also applied to the ancient Germans in general, whose language, the parent of the modern German, the Dutch and kindred dialects, and the Anglo-Saxon, is therefore called the Teutonic (Ger. *Teutsch* or *Deutsch*). The latter term is also used (adjectively) of the Germanic race in a limited sense, embracing the Germans, Dutch, Frisians, Flemings, Swiss, and the descendants of the Anglo-Saxons; and in a wider sense including also the Swedes, Norwegians, Danes, and Icelanders. Accounts of all the Teutonic nations and languages are given in this work under their respective heads.

TEXAS, one of the S. W. states of the American Union, the 13th admitted under the federal constitution, situated between lat. 25° 50′ and 36° 30′ N. and long. 93° 30′ and 107° W.; extreme length from S. E. to N. W., more than 800 m.; greatest breadth from E. to W., about 750 m.; area estimated at 237,504 sq. m. or 152,002,560 acres. It is the largest state in the Union, and has a territory nearly 6 times as great as that of Pennsylvania. It is bounded N. by New Mexico, the Indian territory, from which it is separated by the Red river, and Arkansas; E. by Arkansas and Louisiana, from the latter of which it is separated in part by the Sabine; S. E. by the gulf of Mexico; and S. W. and W. by Mexico and New Mexico. It is divided into 154 counties, viz.: Anderson, Angelica, Archer, Atta-costa, Austin, Bandera, Bastrop, Baylor, Bee, Bell, Bexar, Blanco, Bosque, Bowie, Brazoria, Brazos, Brown, Buchanan, Burleson, Burnett, Calahan, Caldwell, Calhoun, Cameron, Cass, Chambers, Cherokee, Clay, Coleman, Collin, Colorado, Comal, Comanche, Conchos, Cook, Coryell, Culloch, Dallas, Dawson, Denton, De Witt, Dimmitt, Duval, Eastland, Edwards, Ellis, El Paso, Encinal, Erath, Falls, Fannin, Fayette, Fort Bend, Freestone, Frio, Galveston, Gillespie, Goliad, Gonzales, Grayson, Grimes, Guadalupe, Hamilton, Hardeman, Hardin, Harris, Harrison, Haskell, Hays, Henderson, Hidalgo, Hill, Hopkins, Houston, Hunt, Jack, Jackson, Jasper, Jefferson, Johnson, Jones, Karnes, Kauffman, Kemble, Kerr, Kinney, Knox, Lamar, Lampasas, La Salle, Lavaca, Leon, Liberty, Limestone, Liveoak, Llano, McLennan, McMullen, Madison, Marion, Mason, Matagorda, Maverick, Medina, Menard, Milam, Montague, Montgomery, Nacogdoches, Navarro, Newton, Nueces, Orange, Palo Pinto, Panola, Parker, Polk, Presidio, Red River, Refugio, Robertson, Runnells, Rusk, Sabine, San Augustine, San Patricio, San Saba, Shackelford, Shelby, Smith, Starr, Tarrant, Taylor, Throckmorton, Titus, Travis, Trinity, Tyler, Upshur, Uvalde, Van Zandt, Victoria, Walker, Washington, Webb, Wharton, Wichita, Wilbranger, Williamson, Wise, Wood, Young, Zapata, and Zavalla. There are no large cities in the state; the principal towns are: Austin, the capital; San Antonio, the largest town of western Texas; Galveston, the largest commercial port of the state; New Braunfels, the largest of the German settlements; Houston, Marshall, Victoria, Fredericsburg, Corpus Christi, Indianola, Nacogdoches, Castroville, Palestine, Eagle Pass, Lavaca, Richmond, and Rush. The following table exhibits the population of the state at different periods, estimated except for the U. S. census years 1850 and 1860:

Date.	Whites.	Indians and Mexicans.	Free colored.	Slaves.	Total.	Percentage of increase.
1806....	..	..	..	..	7,000	..
1834....	..	..	..	..	21,000	300.00
1836....	30,000	17,670	5,000	..	52,670	150.00
1845....	..	..	..	..	150,000	185.00
1850....	154,431	..	397	58,161	212,592	41.70
1860....	..	..	..	180,682	601,039	182.71

Of the white population in 1850, 84,863 were males and 69,287 females; of the free colored, 211 males and 186 females; and of the slaves, 28,700 males and 29,461 females. The density of population the same year was .89 to the square mile. The whites and free colored occupied 27,988 dwellings, and constituted 28,377 families. The number of deaf and dumb was 59, of blind 78, of insane 87, and of idiots 104. Births (of white and free colored), 4,765; marriages, 2,282; deaths, 2,219; total deaths (including slaves), 3,096. Ages of the total population: under 1 year, 6,194; 1 and under 5 years, 30,594; 5 and under 10, 32,549; 10 and under 15, 28,089; 15 and under 20, 22,568; 20 and under 30, 40,107; 30 and under 40, 26,096; 40 and under 50, 14,969; 50 and under 60, 7,819; 60 and under 70, 2,791; 70 and under 80, 793; 80 and under 90, 221; 90 and under 100, 49; over 100, 39; and 214 unknown. Of the white and free colored population, 49,160 were born in the state, and 87,893 in other states of the Union, making 137,053 of American birth, while 17,378 were born in foreign countries, of whom were from the United Kingdom 2,683 (Ireland 1,403), Germany 8,277, Norway 105, Switzerland 184, France 647, British America 187, and Mexico 4,459. The occupations of 42,856 free males over 15 years of age in 1850 were as follows: commerce, trade, manufactures, mechanic arts, and mining, 7,327; agriculture, 25,299; labor not agricultural, 6,194; army, 584; sea and river navigation, 321; law, medicine, and divinity, 1,368; other pursuits requiring education, 996; government civil service, 677; other occupations, 90. The number of slaveholders in 1850 was 7,747, viz.: holders of 1 slave, 1,935; of 1 and under 5 slaves, 2,640; 5 and under 10, 1,585; 10 and under 20, 1,121; 20 and under 50, 374; 50 and under 100, 82; 100 and under 200, 9; 200 and under 300, 1. The federal representative population of Texas in 1860 was 529,972, entitling the state to 4 representatives in the next congress.—The coast of Texas, like that of North Carolina, is bordered with a chain of low sand islands, formed from the deposits of the Mississippi and other rivers, between which and the mainland lie a series of bays, sounds, and lagoons; the most important of these, commencing at the N. E., are Galveston, Matagorda, Espiritu Santo, Aransas, and Corpus Christi bays, and the Laguna del Madre. Galveston bay is the largest, and has the best entrance, its inlet having 12 feet of water, while in good anchorage just outside there is 24 feet; it extends inland from the gulf of Mexico 35 m. Matagorda bay, 60 m. long by 6 to 10 wide, and Laguna del Madre, 90 m. long by 3 to 6 wide, are properly sounds, and run parallel with the shore. The entrance of Matagorda bay, which is rapidly filling up, has only 7 feet of water; and San Luis inlet, the entrance to West bay, a sound connecting with Galveston bay, has but 6 feet. Aransas bay is 25 m. long from N. E. to S. W. and about 12 m. wide, and Copano bay, a sound opening into it, is 20 m. long by 8 wide; Corpus Christi bay is 40 m. long by 20 wide, and Espiritu Santo 20 by 10; the entrance to all these is much obstructed by the bars at the inlets. The state is generally well watered. The Rio Grande, whose sources are far up in the Rocky mountains, on the confines of New Mexico and Colorado territories, forms its S. W. boundary; and proceeding northward along the coast, we find the Nueces, San Antonio, Guadalupe, Colorado, Brazos, San Jacinto, Trinity, Neches, and Sabine, the last forming the boundary between Texas and Louisiana. The Red river is the boundary between Texas and the Indian territory through the entire extent to which they are conterminous; and the Canadian, a branch of the Arkansas, crosses the northern portion. The Rio Pecos, a large affluent of the Rio Grande, drains the table lands of western Texas; and the numerous tributaries of the rivers we have named, some of which are themselves considerable streams, give all of the state, except the Llano Estacado, a sufficiency of running water. The Sabine is navigable for 150 m.; the Trinity for 350 m. or more in the season of high water; the San Jacinto, 50; the Brazos, 300; the Nueces, 100; the Rio Grande, 400; and the Red river for nearly its whole course on the N. boundary of the state, though obstructed somewhat by shifting sands for a part of the distance. The only lake of importance in the state is the Sabine, which is rather a bayou, formed by the expansion of the Sabine river. In the south, occupying a part of Nueces and Cameron counties, is the bed of an extensive salt lagoon, now dry, connected with the Laguna del Madre, where considerable quantities of salt lie on the ground.—There are no mountains of great height in Texas. The S. and S. E. portion of the state along the coast is level and of very little elevation; the middle belt is undulating; while the N. and N. W. is mostly an elevated table land, descending gradually from the snow-capped Sierra Madre in Colorado and New Mexico. From this table land, which comprises a small portion of the great American desert, and about three fourths of the Llano Estacado or Staked Plain,* and varies in altitude from 2,500 to 3,500 feet above the sea, ridges of low, broken mountain chains stretch southward, taking the names of the Organ, Waco, and Guadalupe mountains. The last named divide in the Presidio district into two ranges, one following the course of the Rio Grande, the other that of the Rio Pecos, while between them extends a plateau about

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* The Llano Estacado is an elevated plain lying between the Rio Pecos in New Mexico and the head waters of the Brazos, Red river, and Big Wichita in Texas. It is from 3,000 to 4,000 feet above the sea level, and has no trees or shrubs except along the immediate margins of the streams, and never extending 100 yards from them. During the rains a scanty herbage springs up, but soon becomes dry and affords little nutriment. It proves an effective barrier to the progress of the buffalo, which would otherwise descend in vast herds upon the lower and more fertile plains of western Texas. The government in 1855-'6 made some experiments in sinking artesian wells along the plain, with a view to opening a shorter route to the S. W.

2,500 feet above the level of the Rio Grande. The highest summits of these mountains do not rise above 8,000 feet. The Waco and Organ mountains are parallel or nearly parallel with these, and lie between the Rio Pecos and the Colorado. East of the latter river is a lower range, running from N. to S., called the Colorado mountains; and between these and the Brazos are a succession of chains of hills, with an occasional summit of somewhat greater elevation, of which the principal are Caddo and Comanche peaks, Pilot Knob, and Santa Anna mountain. Between the upper waters of the Colorado and Brazos is a large tract of timbered land known as the "mezquite timber," and between the upper Brazos and Trinity a long tract from 5 to 80 m. in width, extending from Caddo peak in Johnson co. to the Canadian river in the Indian territory, and called the Cross Timbers. In the central belt the river bottoms are a rich alluvium from 8 to 20 m. in width, and usually covered with heavy timber, while the prairies extend back from the river basin. The elevated plains of the N. W. have no timber except where a stream forces its way to the surface toward their lower or S. border, and very little herbage except after the rains, when for a brief season a short stunted grass springs up, but soon dries up and affords little pasturage.—Texas, like the states along the Atlantic, presents geological formations of increasing age on passing from the coast to the interior. The country in this direction becomes successively higher, and ranges of hills are passed over, the course of which is in general parallel with the coast line. The general direction of the streams is across these ranges toward the gulf of Mexico. The counties along and near the gulf are formed of alluvial beds of sand and gravel, and on the borders of Louisiana this formation extends as far into the interior as the 31st parallel of N. latitude. The margin of the outcrop of the tertiary strata is marked by hills and rolling lands, which extend from the N. E. toward the S. W., through Jasper, Tyler, Polk, Montgomery, Austin, and Colorado cos. Near the coast at Corpus Christi, the tertiary beds were met with very near the surface in the artesian borings. There is little of geological interest or importance in the sandy district, except in Hardin co., where Dr. Shumard, the state geologist, reports the occurrence of petroleum upon the surface of some remarkable acid springs adjacent to Sour lake. For some distance around these springs the earth is said to be so charged with bitumen as to be employed for purposes of illumination, and to some extent as a fuel. The tertiary belt extends nearly to the N. E. corner of the state, and occupies many of the middle counties in its range S. W. The several groups of the formation abound in fossils of great variety, and afford fertilizing marls and gypsums, and also extensive beds of brown coal or lignite. Some of the last, examined by Dr. Shumard in Rusk co., are from 6 inches to 8 feet thick, and are associated with bituminous shales, fire and potters' clay, sandstones, impure limestones, and iron ore. The lignite sometimes preserves the woody fibre, and sometimes it is of a dull shining black, very compact in texture, with no trace of organic structure. It is likely to be of some value throughout the middle portion of the state as a fuel, and perhaps for the manufacture of illuminating gas. The same formation also contains large bodies of hematite; and in Cass co., on the borders of Louisiana, this ore has been used for some years to supply a blast furnace, which is the only one in the state. Similar ores are said to be very abundant in Rusk, Cherokee, and Nacogdoches cos. Beyond the tertiary region is a wide belt occupied by the cretaceous formations, consisting of beds of limestone, sandstone, clays, and marl. Most of the strata abound in the fossils common to this group, and the prevalence of calcareous matters insures great fertility to the soils of this region and to those of the valleys in the tertiary district below. The western margin of the formation is as far back as Grayson co. on the Red river. To the S. it is met with as far W. as the counties of Johnson, Bosque, Coryell, Burnet, &c. Beyond this region toward the N. W. the coal measures are met with. Young and Buchanan cos. lie in their range, and as many as 4 distinct coal seams have here been recognized, varying from 6 inches to 5 feet, and presenting an aggregate thickness of 8 or 9 feet. The coal beds rest on fire clay, and have their usual accompaniments of shales, sandstones, conglomerates, limestones, argillaceous iron ores, &c. The shales contain a large amount of gypsum, some of it in large and beautiful crystals of selenite. The coal formation is supposed to extend northward into Baylor, Archer, and Clay cos., and southward in the direction of San Saba co., and thence probably to the extreme western part of the state, comprising an area of about 5,000 sq. m. The coal is bituminous, and resembles in quality that of Missouri, Kansas, and Iowa. The formations in the N. W. counties are palæozoic strata abounding in beds of gypsum. In Baylor and Knox cos., between the Brazos river and the Big Wichita, are hills nearly 700 feet high composed almost entirely of this material. It is usually pure white, more or less granular, and is also sometimes fibrous, sometimes a compact alabaster, and sometimes crystallized as selenite. The azoic rocks appear to be met with in but few localities in the state. A rather coarse red granite is described as occupying a considerable portion of Burnet co. in the region of the cretaceous formation, and a beautiful variegated limestone of fine texture, which forms a handsome marble, and is perhaps a metamorphic rock, is also found in the same vicinity. It is recently reported that saltpetre is found in considerable quantity in the limestone caves of this county, and collected for the manufacture of gunpowder. In Llano co., adjoining, metallic ores are met with, as the molybdate of lead, which also seems to indicate metamorphic action. Specimens of lead and copper ores have been brought from the western and northern cos., but no evidence is afforded of the existence of valuable deposits. The lead ores are found to be more or less argentiferous. —The soil of Texas is characterized in general by great fertility. The river bottoms are unsurpassed in this respect by those of any state of the Union. There are 3 or 4 varieties of soil, each well adapted to certain crops. The stiff black soil of the river bottoms is fittest for sugar and cotton, though the latter grows well on the prairies and uplands; the finer black or chocolate-colored soil of the prairie lands yields abundant crops of corn and the cereals, and the lighter copper-colored soil of the uplands is admirable for the grasses and fruits; while the fine silt of the islands produces the best sea island cotton known. The soil of the desert tracts of the N. W. is sandy and charged with carbonate of soda and other alkalies; but even this, wherever it can be irrigated, produces moderately grass and herbage.—The climate of the state is remarkably salubrious, and though sufficiently warm for the production of most of the semi-tropical and some of the tropical fruits, it is less enervating and more free from malarious diseases than that of any other of the gulf states. This is due mainly to two causes: the moist and warm S. E. or S. wind which prevails along the coast and blows far inland, warmed though not heated by the waters of the Gulf stream, which are divided at Cape San Antonio by the colder current that elsewhere underlies them, and which gives to the nights a delicious and healthful coolness, and tempers the heat of the day; and the northers, cool, dry winds, which sweep over the Sierra Madre, leaving all their moisture on its N. side, but producing a decided reduction of temperature, and a sensation of cold, from the evaporation of perspiration, much below that indicated by the thermometer. The northers occur from October to May at intervals of about a week, diminishing in intensity and duration in April and May; in western Texas they rarely last more than 3 days, while at Vera Cruz they often continue 20. They produce a smooth sea on the coast of eastern Texas, blowing directly seaward; but in western Texas, from the southward trend of the coast, they blow parallel to it, and produce a sea which no vessel can ride out at anchor. They are experienced, with different degrees of intensity, over nearly the whole state; but the tract E. of the 95th meridian to its intersection with the Trinity, and thence S. E. to the mouth of the Sabine, and that N. W. from the Pecos, may perhaps be excepted. No cases of phthisis originate within the bounds of the northers, but nervous, rheumatic, and gouty persons suffer severely during their prevalence. The norther is in some respects unpleasant, but it is said to make the climate much more healthy, and the air more pure. With reference to the fall of rain, the state may be divided into 3 regions. The belt of abundant rains lies between the Sabine and the mouth of the Brazos; the region of moderate rains between that river and Matagorda bay; and the dry region between Matagorda bay and the Rio Grande. In this dry region not only do the northers have a greater range and more effectually absorb moisture, but the S. E. wind, or rather here the S. S. E. wind, is drier, from traversing more land before it reaches this portion of Texas. Though situated so near the West Indies, where tornadoes and hurricanes are so common, Texas is never visited by them. Hurricanes never pass the boundaries of the Gulf stream, which off Galveston is 20 m. from land. In 1858 the fall of rain at the Texas military institute, in Fayette co., was 37.74 inches; in 1859, 30.36. In 1858, at a point 15 m. E. of Austin, it was 32.73 inches. The months of greatest rain in Fayette co. were June, January, May, and December; near Austin, March, May, September, and October. The highest mean of temperature for a month in both places was in August, 81.29° and 81.10° respectively; and the lowest was in February in Fayette co., 51.04°, and in November near Austin, 49.06°. The annual mean was 66.15° in the former, and 65.42° in the latter. In 1859, in Fayette co., the highest mean was in August, 84.90°, and the lowest in December, 43°; the annual mean was 68.04°, and of the wet bulb 63.62°. The week from Dec. 2 to 8, 1859, was the coldest ever known in Texas; the average temperature of the week was 29°. Corn planting usually commences about the middle of February, and grain is harvested in the latter part of May, and Indian corn in July. Cotton picking commences about July 10, and continues to Dec. 1. The months of July, August, and September are usually very dry; often not an inch of rain falls in the 3 months.—The vegetable productions of Texas are more varied than those of any other state of the Union, the result of the great variety of temperature and soil included in it. The forest trees of the S. and S. E. are the live oak and other species of oak, the cedar, pine, palmetto, ash, walnut, hickory, pecan, mulberry, cypress, elm, sycamore, cottonwood, and Osage orange, which grows to great size. Further N., in that singular forest wall already mentioned, the Cross Timbers, which separate the dry and barren prairies of the N. W. from the fertile plains of the E., the post oak and blackjack are the principal trees, and stand so far apart as to permit wagons to pass between them in any direction. West of this, and occupying the greater part of 6 counties, is a vast mezquite forest. The mezquite is one of the indigenous trees of Texas, of the acacia tribe. It is seldom more than 6 inches in diameter, and from 20 to 30 feet in height. Its fruit is a smooth flat pod containing 20 seeds. From its bark exudes a gum resembling gum arabic. (See Gum, vol. viii. p. 569.) The tea tree, and the nopal, on which the cochineal insect feeds, are also natives of Texas; the agave and numerous species of cacti are abundant W. of the Nueces. The fruit trees are numerous. The peach, of superior size and flavor, the nectarine, the quince, fig, plum, orange, melon, lime, mulberry, and crab apple are found in most parts of the state; and the vine yields luscious grapes, and some attention is given to the manufacture of wine. Many kinds of berries also are found in the river basins and forests. The vanilla and cayenne pepper are grown in large quantities. The flowers of Texas are of great beauty and grow in wonderful profusion. Mimosas, wax plants, cardinal flowers, trumpet flowers, lilies of numberless varieties, geraniums, asters, dahlias, and many other flowers cultivated at the north, here grow wild. The upland variety of cotton matures and yields abundantly in all parts of the state below lat. 31° N., and the sea island yields as fine a quality and larger crops than in South Carolina and Georgia, on the islands of the coast. In Texas the cotton crop, on account of the temperate character of the climate, can be cultivated to great advantage by small farmers who perform their own labor, and in western Texas (that portion of the state W. of the Trinity) large quantities are thus produced without slave labor. Sugar is made from the sugar cane chiefly in the vicinity of the Brazos river, of quality fully equal to the best Louisiana, and also from the sorghum. Indian corn is cultivated in every settled county in the state. Wheat is raised in all the interior, northern, and western counties, and yields an average of over 15 bushels to the acre. In 1858 there were 632,225 acres planted with cotton, about 225,000 acres with wheat, 16,000 either with sugar cane or sorghum, and about 1,250,000 with Indian corn. Hay is also a considerable crop; and the grasses of the state suitable for grazing or curing are numerous and of superior quality.—The wild animals of Texas are the buffalo, which still roams in considerable numbers in the N. W.; the wild horse, or mustang, of which immense herds are found on the western prairie lands; deer, pumas, jaguars, ocelots, wild cats, black bears, wolves, foxes, some peccaries, raccoons, opossums, rabbits, hares, squirrels of several species, prairie dogs, and in the mountains of the N. W. the antelope, the bighorn, and the moose. Of birds there is the greatest possible variety, including the prairie hen and other grouse, the wild goose, the wild turkey, numerous species of the duck tribe, woodcock, pigeons, turtle doves, snipe, plover, and rice birds; cranes, swans, pelicans, kingfishers, and water turkeys; the bald-headed and Mexican eagles, vultures, hawks, owls, and other rapacious birds; the blackbird, starling, blue jay, paroquet, oriole, cardinal, mocking bird, whippoorwill, woodpecker, redstart, martin, robin, swallow, and wren. There are many varieties of fish peculiar to the Texan coast and rivers, beside the species common to the gulf states. The most numerous are the red fish, a delicious fish often weighing 50 lbs.; the yellow, blue, and white codfish; sheepshead, mullet, flounders, perch, pike, suckers, and sea trout are also abundant. The crawfish, crabs, oysters, clams, mussels, shrimps, and hard and soft shelled turtles are found all along the coasts. Great attention is paid to the raising of horses, cattle, sheep, and swine, and the camel has been introduced with some success.—Among the objects of interest to the tourist are the pass of the Guadalupe mountains in the N. W. part of the state, where the traveller finds himself wandering for hours in an apparently interminable labyrinth of mountain spurs and deep gorges, with lofty walls of terraced limestone almost shutting out his view of the sky, and dark, precipitous ravines, whose bottom is concealed by the shadows of the walls which bound it. The Castle mountain pass and the Waco mountain pass are hardly inferior to this in grandeur. In the N. of Texas the Red river cuts its way through solid rock in a *cañon* or gorge 800 feet in depth. On one of the branches of the Colorado river there is a fall of 120 feet perpendicular, the sheet of water being 100 feet in width. Numerous fossils of gigantic extinct animals have been found in different parts of the state, some of them of larger size than have been discovered elsewhere. In Houston co. there are numerous silicified trees, most of them nearly perpendicular or inclining to the N., but some lying upon the ground.—In 1850 Texas had 12,198 farms, comprising 643,976 acres of improved and 10,852,363 acres of unimproved lands, the whole value of which was estimated at $16,550,008. The value of farming implements and machinery was $2,151,704. In 1858 the farming lands under cultivation amounted to 47,937,537 acres, valued at $73,677,316. The live stock in 1850 consisted of 76,760 horses, 12,463 asses and mules, 217,811 milch cows, 51,285 working oxen, 661,018 other cattle, 100,530 sheep, and 692,022 swine; the value of live stock was $10,412,927, and of animals slaughtered $1,116,137. The products of animals were: 2,344,900 lbs. of butter, 95,299 of cheese, and 131,917 of wool. The crops of 1849 were: wheat, 41,729 bushels; rye, 3,108; oats, 199,017; Indian corn, 6,028,876; potatoes, 1,426,803; barley, 4,706; hay, 8,354 tons; peas and beans, 179,350 bushels; beeswax and honey, 380,825 lbs.; flax, 1,048 lbs.; cane sugar, 7,351 hhds.; molasses, 441,918 galls.; cotton, 58,072 bales; rice, 82,203 lbs.; tobacco, 66,897 lbs. Value of produce of market gardens, $12,354; of orchard products, $12,505. In 1858 the number of horses was 288,203, valued at $11,583,247; of cattle, 2,220,433, valued at $13,259,537. In 1860 the number of sheep, estimated from the returns of over 100 counties, was over 350,000. The cotton exported directly to foreign ports in the year ending July 1, 1860, was 125,641 bales, valued at $5,744,981, and the whole crop was estimated at 400,000 bales. The wheat crop of 1859 was estimated at 3,750,000 bushels; the corn crop was about 25,000,000 bushels; the sugar crop was not estimated. The statistics of the manufactures of the state in 1850 were: value of home-made manufactures, $266,984; manufacturing establishments, 309; capital, $589,290; raw material used, $394,642; hands employed, 1,042 male and 24 female; annual wages, $322,368; annual product, $1,165,538. Among the manufactories noted are a woollen mill, employing $8,000 capital, using 30,000 lbs. of wool valued at $10,000, and producing $15,000 worth of goods; 2 iron founderies, employing $16,000 capital; and 2 salt factories, with $3,475 capital.—The state, in reference to its inhabitants as well as its pursuits, has two great divisions. Eastern Texas, including that portion of the state lying E. of the Trinity river, is inhabited principally by emigrants from the southern states; the landholders have mostly large plantations, hold the greater part of the slaves of the state, and cultivate by slave labor cotton, rice, sugar, wheat, and Indian corn. Western Texas, lying W. of the Trinity, is occupied mostly by emigrants from Germany, France, and other European countries, and the northern states; the farms are smaller, and cotton, sorghum, sugar and molasses, wheat, Indian corn, &c., are the principal crops, which are almost entirely cultivated by the farmers and their families, very little slave labor being employed.—The state has great facilities for both internal and foreign commerce. Her large rivers, though somewhat obstructed by sand bars, are yet navigable far into the interior; and the railroad lines in operation and in course of construction will greatly increase the facilities for bringing products to market. The direct exports from Texan ports to foreign countries in the year ending July 1, 1860, were $6,784,934, of which $5,839,757 worth was cotton. The direct imports for the same year were $2,486,408. The value of imports from Mexico in 1859, for 11 months, was $3,865,312. The enrolled and licensed tonnage of the state the same year was 7,668 tons, of which 1,006 tons were built that year. The arrivals of American and foreign vessels at the several ports of entry from foreign countries in 1859 were 76, tonnage 32,812, and the clearances for foreign countries were 108, tonnage 48,763. The internal and coasting commerce very greatly surpasses this, and the great bulk of the exports from the state are sent to New Orleans and New York, to both which ports large seagoing steamers usually ply weekly or oftener. There is but one canal in Texas, extending from West bay to the Brazos river; but there have been improvements of the rivers and harbors completed at a cost of nearly $370,000. On Jan. 1, 1861, there were 2,667 m. of railroad projected and in progress in the state, of which 294.50 were completed, at a cost of $9,200,000. Since that time several roads have been completed or extended. The amount in operation in the autumn of 1861 was nearly or quite 450 m. The Buffalo Bayou, Brazos, and Colorado road extends from Harrisburg (which is connected with Galveston by steamer) to Columbus, a distance of 175 m.; the Houston Tap and Brazoria road, from Houston to Columbia on the Brazos, 50 m., and perhaps to Wharton on the Colorado, a further distance of about 40 m.; the Houston and Texas central, from Houston to Navasota, and probably to Booneville, 70 or 100 m.; the Washington co. road, from Hempstead to Brenham, 25 m.; the Texas and New Orleans road, from Orange on the Sabine river to Houston, 106 m.; and there is a short line from Shreveport, La., to Marshall, Texas, intended as the commencement of the southern Pacific road.—Texas has an institution for the deaf and dumb at Austin, founded in 1857, and endowed with 100,000 acres of state land; the number of pupils in 1860 was 30, and the current expenses $9,000 per annum. There is an institute for the blind in the same city, which was incorporated in 1856, and which is also endowed with 100,000 acres of land; in 1859 it had 10 pupils, and the current expenses were $6,500 per annum. Near Austin there is a lunatic asylum in course of erection, intended to accommodate when completed 250 patients. An appropriation of 100,000 acres of land has also been made for an orphan asylum. The state penitentiary is at Huntsville, Walker co. It is on the silent or Auburn plan, and the labor of the prisoners is let to contractors. In Sept. 1860, the number of prisoners was 200, of whom 160 were employed in the prison factory, manufacturing osnaburgs and coarse woollen goods; 8 in the cabinet and clothing shops; and 32 were sick, invalids, or in the floating force. The cost of raw material in the factory was $76,187, and the value of the manufactured goods $124,598.—The school fund of the state on Sept. 1, 1860, amounted to $2,531,520.64, and the amount distributed to counties was $112,595.31. Beside this, each county has 17,712 acres of land set apart for school purposes, and from the proceeds of this may materially increase the annual appropriation to its schools. The school fund consists of the sum of $2,000,000 of the 5 per cent. U. S. bonds set apart for the purpose, to which is added annually $\frac{1}{10}$ of the state tax. The number of children of school age (6 to 18) in 1860 was 104,447, and the amount distributed $1 to each. There is also a university fund, which in 1860 amounted to $111,000, the interest of which is at present accumulating. There are numerous academies and female seminaries in the state, and 3 colleges, viz.: Aranama college (Presbyterian), at Goliad in Goliad co., founded in 1852, and which in 1860 had 3 professors, 75 students, and 1,800 volumes in its library; Austin college (also Presbyterian), at Huntsville, Walker co., which in 1858 had 5 professors and over 100 students, exclusive of those in the law department; and Baylor university, at Independence, Washington co., founded in 1845, and having 5 professors and about 150 students in 1858.

There is also a military institute of considerable reputation at Rutterville, Fayette co., established in 1856. The total number of churches reported in 1850 was 328, of which 70 were Baptist, 5 Christian, 5 Episcopal, 7 Free, 173 Methodist, 47 Presbyterian, 13 Roman Catholic, 2 Union, and 6 of minor sects. The total value of church property in that year was $206,930, and the whole number of sittings was 64,155. In 1850 there were 34 newspapers published in Texas, printing annually 1,296,924 copies; of these 5 were tri-weekly and 29 weekly. In 1860 there were 84 newspapers published in the state, of which 3 were daily and weekly, 1 tri-weekly and weekly, 79 weekly, and 1 monthly.—The constitution, adopted in 1845, has the following among other provisions: Every free male person (Indians, Africans, and descendants of Africans excepted), 21 years of age, who is a citizen of the United States, or who was at the adoption of the constitution a citizen of Texas, and has resided in the state one year, and in the district, county, city, or town where he proposes to vote 6 months, is a qualified elector. Representatives must have been resident citizens for 2 years, and have resided in the district they represent one year prior to their election, and must be at least 21 years of age. Senators must have been resident citizens for 3 years, must have resided in the district they represent one year, and have attained the age of 30 years. The members of the house are elected for 2 years, and must not be fewer than 45 nor more than 90; of the senate, elected for 4 years, not fewer than 19 nor more than 33. The present numbers are 66 and 21. Clergymen are not eligible to the legislature nor to state offices, nor persons holding lucrative office under the U. S. government, nor collectors of taxes until they have obtained a discharge for the amount of their collections. The sessions of the legislature are biennial. The judiciary of the state comprises a supreme court, having only appellate jurisdiction, consisting of one chief justice and two associates, each having a salary of $3,000; and 20 district courts, each presided over by a single judge residing in his own district, having original jurisdiction, and receiving a salary of $2,250. Both the supreme and district judges are elected by the legislature on the nomination of the governor, for the term of 6 years. The governor is elected by the people for 2 years, but cannot hold the office more than 4 years in any period of 6 years; his salary is $3,000 and a furnished house. The secretary of state is appointed by the governor for 2 years; the attorney-general, treasurer, comptroller, and commissioners of land office and claims are elected by the people biennially. The state engineer is elected by a joint vote of the two branches of the legislature; his salary is $3,000, and that of the other state officers from $1,800 to $2,000. The legislature is prohibited from granting either lotteries or divorces. No individual may issue bills, checks, promissory notes, or other paper to circulate as money; and no corporate body is to be created, renewed, or extended, with banking or discounting privileges. The state cannot be part owner of the stock or property belonging to any corporation. The provisions of the constitution relating to slaves prohibit their being brought into the state as merchandise, direct that they shall have jury trial in all cases above the grade of petit larceny, and that personal injuries to or maiming of a slave, or depriving him of life, shall be punished in the same way and to the same extent as if white persons, except in cases of insurrection of such slave; they also authorize the legislature to pass laws protecting the slave, and punishing the owner who maltreats him by taking him away and selling him for the owner's benefit. The state was in 1860 entirely free from debt. In 1851 it received the $10,000,000 U. S. bonds to be paid by the U. S. government in consideration of her cession of territory and reduction of boundaries; and from the income and part of the principal of this, after settling her indebtment, with a small tax ($\frac{1}{8}$ of 1 per cent.) on real estate and a capitation tax of 50 cts., the state expenses were defrayed up to that time. The total taxable property in 1858 was $198,636,818, including 47,937,537 acres of land, valued at $78,677,316; 43,690 town lots, $12,861,990; 184,201 slaves, $71,912,496; 238,203 horses, $11,583,247; 2,220,433 cattle, $13,259,537; and miscellaneous property, $6,347,298. In 1859 the total taxable property was $224,853,266, the increase being in the value of slaves, $12,774,820; land, $9,477,542; cattle, $2,739,421; horses, $2,617,502; town lots, $1,388,984; money lent, $518,047; and miscellaneous property, $1,208,812. The total tax of 1859 was $809,726.60, and the average value of land per acre was $1.88. On Aug. 31, 1860, the funds in the state treasury were: revenue of state, $127,934.02; university land sales, $19,978.55; school fund, $2,531,520.64; sinking fund on railroad bonds, $28,920; special deposits, $41,748.77; total, $2,750,091.98.—The first European visitors to the shores of Texas were a colony of French emigrants led by the sieur de La Salle, who, designing to found a settlement in the delta of the Mississippi, sailed past it unawares, landed in Matagorda bay, erected Fort St. Louis on the Lavaca, and after a series of misfortunes was murdered near the Neches river by his own men in 1687. In 1689 Capt. De Leon, a Spanish officer, was despatched to the Lavaca to scour the country and hunt out the French. He arrived there on April 22, found the garrison scattered, and returned the next year with 110 men and some friars, and established on the site of Fort St. Louis the mission of San Francisco. In 1691 a Spanish governor of the region was appointed, and soldiers sent to enforce his authority; but in 1698 the hostility of the Indians, the failure of the crops, and the death of their cattle discouraged the colonists, and the settlement was abandoned. The Spaniards had settlements at El Paso and at San Juan Bautista, both on the right bank of the Rio Grande, but none within the present bounds of Texas. In 1714 the French again attempted to effect a settlement within its limits, and Crozat, to whom Louis XIV. had granted the whole of Louisiana, sent Huchereau St. Denis upon an expedition thither. He penetrated from the Sabine to the Rio Grande, and visited the Spanish mission of San Juan, where he was taken prisoner by the governor of Coahuila; but having subsequently married the daughter of the commandant of that mission, he introduced Spanish missionaries into Texas, who established a mission on the bay of San Bernard, another west of the Sabine and near the coast (the famous mission of Dolores), and a third on the right bank of the San Pedro, near San Antonio, subsequently removed eastward, and known afterward as the Alamo. Two other missions were established soon after, one near Nacogdoches, the other not far from San Augustine. The name of "the New Philippines" was now given to the country, and in 1715 the marquis de Aguayo was made governor-general of the colony. For 20 years the Spaniards held sole sway over this colony, and multiplied their settlements. In 1735 St. Denis, who had acquired great influence over the Texas Indians, aided in removing a French settlement on the Red river into Texas; the Spaniards protested, but owing to quarrels among themselves did not drive them out, and finally conceded that they had a right to the region they were occupying. Texas did not prosper under its Spanish rulers, and in 1744 its European population did not exceed 1,500. In 1758 the Indians attacked the mission of San Saba, and killed all its inhabitants. This caused the decline of the missions in Texas, as the slaughter was never avenged. In 1763 the feud between France and Spain was finally settled by the cession of Louisiana by the former power to the latter; and up to the establishment of peace between the United States and Great Britain in 1783, there were no events of interest connected with its history. By treaty with Great Britain before the war of the American revolution, Spain had conceded the free navigation of the Mississippi, and the right to make New Orleans a place of deposit for goods *in transitu*. These privileges she was disposed to withhold from the United States, which had succeeded to the British title, from fear that they would lead to aggressions upon her territories along the gulf coast. For a long time war seemed imminent, but was finally averted by the difficulties of Spain at home. In 1803, Spain having re-ceded Louisiana to France, that power ceded it to the United States; and as there had been no well defined boundary between Louisiana and the old Spanish possessions W. of it, a controversy at once ensued between Spain and the United States on the question of boundaries, Spain claiming a region E. of the Sabine, and the United States urging that they were entitled to the country W. as far as the Rio Grande. At one time the U. S. authorities drove the Spaniards across the Sabine, and for some time the troops of the two nations occupied the opposite banks of that river, and a collision seemed inevitable; this was finally averted, in Oct. 1806, by the prudence and discretion of Gen. Herrera, the Spanish commander, who entered into an agreement with Gen. Wilkinson establishing the territory between the Sabine and Arroyo Honda as a neutral ground, and retiring W. of that line. The illicit trade with Mexico carried on through Texas was so lucrative as to engage numerous adventurers in it, some of whom were captured and treated with great cruelty by the Spanish authorities; and as the relations of Spain with her American colonies were becoming very unsatisfactory, there were frequent attempts made to throw off the Spanish yoke both by Mexico and the settlers in Texas, many of whom belonged to this class of adventurers. From 1806 a series of revolutionary efforts commenced, beginning with the projected movement of Aaron Burr, and embracing the expeditions of Magee, a former lieutenant of the U. S. army; of Col. Kemper, his successor; of Bernardo Gutierrez; of Col. Ellis P. Bean, who had suffered a protracted and cruel imprisonment from the Spanish authorities; of Gen. J. A. Toledo, a Cuban republican; of Col. Perry, an American officer of considerable ability; of Auzy, who styled himself governor of Texas; and of Xavier Mina, a Spanish refugee, who aided in the capture of Galveston island in 1816. In these expeditions there were several severe battles fought between the invaders and the Spanish authorities; on two occasions in 1813, the invaders defeated the Spanish forces, and caused them a loss of more than 1,000 killed and wounded. These defeats were terribly avenged in the same year, when, of a force of 2,500 Americans and Mexicans, all were slain but about 100, a considerable number being butchered in cold blood, and nearly 700 of the peaceable inhabitants of San Antonio murdered. In 1817 Mina won several victories in conflicts with the Spanish troops, but was finally defeated, taken prisoner, and shot on Nov. 11 of that year. Col. Perry attempted to return by land to the United States; but having with a force of only 50 men demanded the surrender of La Bahia, a Spanish garrison, he was attacked in the rear by a troop of 200 royalist cavalry, and, all his men having fallen, blew out his own brains with his pistol. After the close of the war of 1812 Lafitte, the pirate of the gulf, made Galveston island his head-quarters, and established a town there named Campeachy. He also claimed to be acting under authority of the Mexican republic, and it is said actually received such authority from Col. Bean, one of the revolutionary leaders. He remained here till 1821, when, a naval force having been despatched by the U. S. government to break up the settlement, he abandoned Texas for ever. In 1819 the long controversy between the United States and Spain in regard to the Texan boundary was terminated by the cession of Florida to the United States and the establishment of the Sabine as the boundary line, with a guaranty to Spain of her possessions W. of that river. This treaty occasioned much dissatisfaction on the part of the western and south-western states. Mr. Clay and other prominent men opposed it. Another revolutionary expedition was organized at Natchez the same year, under the command of Dr. James Long, a Tennesseean, which penetrated as far as Nacogdoches and established a provisional government there, and the leader went to Galveston island to secure the coöperation of Lafitte; but while absent his force was routed and cut to pieces by the royalist troops, and Long himself escaped with difficulty across the Sabine. In a second expedition he took possession of La Bahia without difficulty; but, though Mexico had become independent under the presidency of Iturbide, he and his followers were taken prisoners and sent to Mexico, where after a brief imprisonment he was set at liberty, but almost immediately assassinated, in 1822. Texas at this time was almost wholly deserted, the settlement at Galveston entirely abandoned, and the few inhabitants at other points reduced to poverty by the civil war which had so long existed. In 1820 Moses Austin, a native of Connecticut, but at that time a resident of Missouri, received from the Spanish authorities of Mexico a grant of lands in Texas for which he had petitioned a year previous; he died, however, before he was able to avail himself of it. His son, Stephen F. Austin, received a confirmation of the grant in April, 1823, having already in the beginning of 1822 conducted a considerable number of colonists to the site he had selected in the vicinity of the present county of Austin, and more soon followed. The grants of land to colonists were very liberal, 177 acres at least being given to each farmer, and a larger quantity if he had a family, and to each stock raiser 4,428 acres; the emigrants for the first 6 years were to be free from taxes, tithes, duties, &c. The founder of the colony, for each 200 families he introduced, was to receive 66,774 acres of land, but was limited to 3 times this amount however many families he might colonize. The colony increased rapidly, and Austin obtained permission to bring in 500 more families (his first grant was for 300). Others also followed in the establishment of colonies in the same vicinity. The Mexican constitution, adopted in 1824, united Coahuila, hitherto a separate province, with Texas in a single state, and the congress of the united state placed a Mexican as commandant of the department of Texas. The injustice of this commandant toward the American citizens, especially those attached to the colony of Haydon Edwards, adjacent to that of Austin, created difficulty; and an appeal being made to the governor of the state, who was also a Mexican, he without trial or examination annulled Edwards's grant and expelled him from the state. A band of American criminals, fugitives from justice who had settled in that vicinity, organized themselves into a company of "regulators" to harass the colonists who had taken up lands under Edwards and drive them from the farms they had improved. Thus oppressed, Edwards and his colonists attempted unsuccessfully to effect a revolution; and in Jan. 1827, they were compelled to retreat into the United States. A somewhat more liberal course was pursued by the Mexican authorities after this event, and the colonies prospered, though occasionally harassed by the Indians, whose forays injured their trade with Mexico. In 1830 Bustamente, who had seized the dictatorship of Mexico, issued a decree forbidding the people of the United States to enter Texas as colonists, and suspending all colony contracts which interfered with this prohibition. From this time forward the jealousy of the Mexican government against the emigrants from the United States became every month more manifest, and reckless and unprincipled adventurers, like Bean, Gaines, and Bradburn, who had long before become obnoxious to the government under which they were born and to good citizens everywhere, united with the Mexican government, or rather went beyond it, in acts of oppression and outrage upon the peaceable colonists. The Indians also were constantly becoming more and more ferocious and troublesome, and in several instances pitched battles were fought with them. In 1832 the Texans, sustaining the *pronunciamiento* of Vera Cruz in favor of the constitution, and in opposition to the rule of Bustamente, were attacked by a force sent by Bradburn to enforce the authority of that despot; but in the battle which followed the Mexicans were defeated with heavy loss. In 1833 the American settlers in the state, now numbering over 20,000, held a convention and determined to separate themselves from Coahuila, which was exclusively Mexican in its population, and accordingly prepared a state constitution and an address to the general government, of which Santa Anna was now the head, requesting admission in the capacity of a separate state into the republic. This movement was one in which the best men of Texas were all united. Col. S. F. Austin was one of the commissioners, and the only one who went to Mexico to present the request of the memorialists. He was unsuccessful, and was detained in Mexico till Sept. 1835, but in 1834 succeeded in procuring the revocation of the decree of Bustamente prohibiting the admission of colonists from the United States, and several other favorable concessions. Meantime the Mexican inhabitants of Texas and Coahuila had quarrelled, and each had set up a revolutionary government; but the Anglo-American residents remained quiet. Santa Anna sought to amuse Austin and the Texans with promises of allowing them a state government till he could occupy the state with his troops. The state legislature, which had been in opposition to him, but which was guilty of great frauds and outrages, was broken up at the approach of his troops, and the state was without a government. The Texans must either maintain a government of their own, or submit to the dictator, who had already deceived them. They chose the former alternative, and established at first committees of safety, the first being appointed at a meeting at Mina (now Bastrop), May 17, 1835. Others followed, and on the return of Austin in September it became evident that war was inevitable. The first battle, or rather skirmish, was fought near Gonzales, Oct. 2. Other battles soon occurred; Goliad was captured by the Texans on Oct. 9, and the battle of Conception was fought on the 28th. Col. Austin was made commander-in-chief. On Nov. 12 the "Consultation," a body composed of delegates from the committees of safety, met at San Felipe de Austin, and proceeded to the organization of a provisional government. Henry Smith was elected governor and J. W. Robinson lieutenant-governor, and a general council was organized. At the same time, Gen. Austin having resigned, Gen. Sam Houston was elected commander-in-chief, and the former appointed a commissioner to the United States. San Antonio de Bexar was taken on Dec. 10, 1835, after being cannonaded for 6 days, and on the 14th Gen. Cos, the Mexican commander, started for Mexico with upward of 1,000 of the troops who had surrendered. By this battle the entire armed Mexican force was driven out of Texas. On the 22d a "Declaration of Independence" was issued at Goliad by Capt. Philip Dimitt and some other persons there. Santa Anna, on receiving intelligence of the surrender of Gen. Cos, at once determined upon active measures for the reduction of Texas, and set out with an army of 7,500 men well provided with artillery, ammunition, and stores. Gen. Houston had caused San Antonio de Bexar to be dismantled, and on Feb. 23, 1836, Santa Anna with a large detachment of his army invested the Alamo, a strong fort near San Antonio, which was garrisoned at this time by 140 men under command of W. B. Travis, and 32 more subsequently forced their way through the Mexicans into it. Santa Anna with a force of 4,000 men bombarded it for 11 days, and finally carried it by storm. On March 6 the whole garrison were put to the sword, and but 3 persons, a woman, a child, and a servant, were spared. The Mexican loss was 1,600. On the 17th of the same month the convention adopted a constitution and elected a president (David G. Burnett) and other officers of the new republic. Meanwhile Gen. Houston found it necessary on the approach of Santa Anna to evacuate Gonzales. The tragedy of the Alamo, the murder of Col. Fannin's command in cold blood at Goliad, March 27, 1836, by Santa Anna's order, in violation of the terms of surrender (see FANNIN), and the successive defeats of the Texan troops, produced a temporary panic. This was increased by the continued retreat of Gen. Houston, who fell back first to the Colorado, then to the Brazos, and finally to the San Jacinto, his design being to scatter and divide the Mexican force, in which he was eminently successful. The alarm soon passed away, and having collected a force of about 800 troops, he gave battle on April 21 to the Mexican forces which had pursued them, of about twice the number, and defeated them completely, killing 630, wounding 208, and taking 730 prisoners; among the latter (though not captured till the next day) was the Mexican president, who had commanded in person. Santa Anna, at Gen. Houston's request, sent an order to Gen. Filisola, who was on the Brazos, directing him to fall back to Bexar, and to direct Gen. Urrea to retire to Guadalupe Victoria, and not to molest the Texans, as he had agreed upon an armistice. The Mexicans were at once demoralized by the defeat and half starved, for the Texans had taken the vessels sent with supplies. They retreated rapidly westward in disorder; and when the Texan commissioners arrived at the Mexican camp with the treaties into which Santa Anna had entered with the Texan provisional government, agreeing to withdraw all troops from Texas, and to open the way for negotiation for the recognition of her independence, asking its ratification on the part of Gen. Filisola and its transmission through him to the Mexican government, the Mexican army was by no means formidable. Santa Anna was held a prisoner, but the war was practically ended; and though the Mexican government made several attempts to fit out other armies for its recapture, and refused to acknowledge its independence, their armies did not again invade the country. The population of the state had increased to about 52,000, and the intelligence of the massacres at the Alamo and Goliad had enlisted so much sympathy for the Texan cause in the United States that considerable bodies of troops had come in to aid them. Gen. Houston, who had been wounded in the battle of San Jacinto, and had resigned his command of the army, was, in Sept. 1836, elected to the presidency of the republic, and on Oct. 22 was inaugurated. The first congress of the republic assembled at the same time, the constitution having been adopted in the election of September. In March, 1837, the United States acknowledged the independence of Texas. Mexico yet maintained a hostile attitude, but her efforts were confined to occasional captures of Texan vessels, and to the stimulation of the Indians to make predatory incursions upon them; and both these methods of annoyance led to reprisals in kind. In 1838 Mirabeau B. Lamar succeeded Gen. Houston as president of the republic. During his administration an agent of the Mexican government to the Indian tribes at the north, with some of his guard, was killed, and from the commissions found in his possession it was discovered that

that government was endeavoring to incite the Indians to commence a harassing and destructive warfare all along the frontier. The timely discovery of this design prevented its execution. There were, however, repeated incursions made by the Comanches and other tribes; and in Aug. 1840, the Texans under the command of Ben McCulloch (subsequently distinguished as the commander of the Texan rangers in the Mexican war, and as a general of the confederate forces in the civil war of 1861–'2, and killed at the battle of Pea Ridge in Arkansas, March 8, 1862) pursued them after one of their forays, penetrated into their country, and in several successive conflicts inflicted upon them summary and severe punishment. In 1840 the independence of the republic was acknowledged by England, France, and Belgium. But while thus recognized by leading powers as independent, her financial condition was every month becoming more deplorable. The debt, in Oct. 1840, was $4,822,318, and the treasury notes had become depreciated to 12 or 15 cents on the dollar. Various plans of relief were proposed, and at one time Gen. Hamilton, the agent of the republic in France, had as he supposed negotiated a loan with the banking house of Laffitte and co. there; but owing to some differences between the French consul at Galveston and the Texans, he did not succeed in completing it. Finding their credit at the lowest possible ebb, Gen. Houston, who had again become president in Dec. 1841, recommended the abandonment of all attempts to borrow, the suspension of their debt, the reduction of all expenses, and the payment of duties in specie or par funds. A part of these recommendations were adopted, but with little relief. Meanwhile, in 1841 and 1842, the Mexican government sent two marauding expeditions into Texas, one of which captured and plundered San Antonio, and then retreated rapidly, making no attempt at subjugating the country. The Texans attempted reprisals by two ill-judged expeditions, neither of them under the direction of the government, the first in 1841 to Santa Fé, the second in 1842 to Mier in the Mexican state of Tamaulipas. Both were unsuccessful; many of the Texans were taken prisoners by the Mexicans, and subsequently executed. In the Mier expedition 18 were shot in cold blood by the order of Santa Anna. In the spring of 1843 a third expedition, intended to intercept the Mexican traders to Santa Fé, was fitted out by private parties, but with the approbation of the government, which also proved a failure. The same year, on the remonstrance of the British chargé d'affaires to Mexico, Santa Anna, who was still in power, informed Gen. Houston that he would agree to an armistice; and commissioners were appointed on both sides. While the negotiations were pending, President Tyler, through his secretary of state, Mr. Upshur, made propositions to the president of Texas for her annexation to the United States, which were after a time favorably received, and a treaty was made looking to annexation. This treaty was completed and signed by the Texan commissioners and Mr. Calhoun, April 12, 1844, but was rejected by the United States senate on June 8. The agitation of this subject greatly irritated Mexico, and caused her to terminate the armistice and threaten the renewal of hostilities; it also displeased Great Britain and France, who desired to see Texas under an English or joint protectorate, without slavery, and free from the influence of the United States. The rejection of the annexation treaty therefore delighted those parties, while for the time it placed Texas in a humiliated position. In Dec. 1844, Dr. Anson Jones was inaugurated as president of the republic. The state in its internal affairs was becoming more prosperous. Its revenues were increasing, and its population growing with great rapidity, and the threats of war from Mexico were rendered powerless by her weakness and dissensions. The only disturbance within the boundaries of the state was the conflicts between the "regulators" and "moderators," two bodies of ruffians, murderers, counterfeiters, horse thieves, and the like, numbering nearly 200 each, who were engaged in Shelby and the adjacent counties in plundering, robbing, and killing peaceful citizens, and the members of the gang opposed to them. These were finally put down by armed force. In the session of the U. S. congress following the election of Mr. Polk to the presidency, joint resolutions for the annexation of Texas were introduced and passed the house of representatives, by a vote of 120 to 98, Feb. 25, 1845, and the senate by a vote of 27 to 25 on March 1, and were approved by President Tyler the same day. President Jones called a convention of 61 delegates to meet on July 4 to consider the propositions for annexation, and that convention ratified the act and prepared a constitution for the republic as a state of the federal Union, which was submitted to the people and approved by them. The joint resolution by which the annexation was effected was in the following words:

> "That congress doth consent that the territory properly included within, and rightfully belonging to the republic of Texas, may be erected into a new state, to be called the state of Texas, with a republican form of government, to be adopted by the people of said republic, by deputies in convention assembled, with the consent of the existing government, in order that the same may be admitted as one of the states of this Union. And, that the foregoing consent of congress is given upon the following conditions, and with the following guarantees:
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> "First. Said state to be formed, subject to the adjustment by this government of all questions of boundary that may arise with other governments; and the constitution thereof, with the proper evidence of its adoption by the people of said republic of Texas, shall be transmitted to the president of the United States, to be laid before congress for its final action, on or before the 1st day of January, 1846.
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> "Second. Said state, when admitted into the Union, after ceding to the United States all public edifices, fortifications, barracks, ports and harbors, navy and navy yards, docks, magazines, arms, armaments, and all other property and means pertaining to the public defence belonging to said republic of Texas, shall retain all the public funds, debts, taxes, and dues of every kind which may belong to, or be due and owing said republic; and shall also retain all the vacant and unappropriated lands lying within its limits, to

> be applied to the payment of the debts and liabilities of said republic of Texas; and the residue of said lands, after discharging said debts and liabilities, to be disposed of as said state may direct; but in no event are said debts and liabilities to become a charge upon the government of the United States.
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> "Third. New states, of convenient size, not exceeding four in number, in addition to said state of Texas, and having sufficient population, may hereafter by the consent of said state be formed out of the territory thereof, which shall be entitled to admission under the provisions of the federal constitution. And such states as may be formed out of that portion of said territory lying south of thirty-six degrees thirty minutes north latitude, commonly known as the Missouri compromise line, shall be admitted into the Union with or without slavery, as the people of each state asking admission may desire; and in such state or states as shall be formed out of said territory north of said Missouri compromise line, slavery or involuntary servitude (except for crime) shall be prohibited."

The state of Texas was admitted into the Union on Dec. 27, 1845. After its admission, which led to a war with Mexico, it found itself unable to pay its debts from the proceeds of its public lands, and on Aug. 2, 1850, congress, as one of the compromise measures of that year, voted to pay to the state $10,000,000 in 5 per cent. bonds, payable 14 years after date, in consideration of the reduction of her boundaries (by giving up a portion of her northern territory to New Mexico), cession of territory, and relinquishment of claims against the United States. With the proceeds of these bonds she paid off her debts, averaging 79 cents on the dollar on the claims against her. Soon after the presidential election in 1860 there were indications in some of the E. counties of a desire for secession from the United States; but Gov. Houston refused to call a convention to consider the subject, and declared that secession would prove the ruin of the state. A call for a convention, signed by 61 persons, was published, and to avoid a collision Gov. Houston called an extra session of the legislature for Jan. 22, 1861. The legislature, in opposition to his views, sanctioned a convention, but required that if a secession ordinance was passed it should be submitted to the people. The convention assembled on Jan. 28. Nearly one half the counties of the state, some of them among the most populous, held no election for it, and were not represented; and in many of those which elected, not over ¼ or ⅓ of the voters of the county took part at the polls. The ordinance of secession was passed by this convention on Feb. 5, by ayes 166, noes 7. It was to be submitted to the people on Feb. 23, except in El Paso co., where it was to be submitted on the 18th. The convention then adjourned to Feb. 20. Meantime the legislature authorized the issue of state bonds to the amount of $500,000, and of treasury warrants receivable for taxes. The governor, on the passage of the secession ordinance, published an address protesting in the name of the people against all the acts and proceedings of the convention. The convention on reassembling, by a vote of 127 to 4, deposed the governor and secretary of state, and directed the lieutenant-governor to take the place of the governor. This done, they adjourned on Feb. 25. The secession ordinance was said to have been passed by a large majority. Early in Feb. 1861, Gen. David E. Twiggs indicated to the convention his willingness to surrender to the state, or rather to the secession party in the state, the arms, ammunition, stores, horses, mules, wagons, and money in his possession belonging to the United States; and on the 18th an agreement was entered into between him and commissioners appointed by the state for such surrender. By this act, 13 forts, 15,000 stand of arms, 80 pieces of ordnance, $55,000 in specie, about 1,200 horses, and mules, wagons, tents, provisions, ammunition, and munitions of war to the estimated value of nearly $2,000,000, were given up. By the agreement, the U. S. soldiers and subordinate officers, 2,500 in number, were to be allowed their arms and furnished with transportation that they might leave the state without hindrance or pledge; but this agreement was broken, and they were all taken prisoners, stripped of their arms, and only released on parole not to serve against the confederate states. In June the acting governor (Clarke) issued a proclamation forbidding any citizen of Texas to hold intercourse with any of the northern states or territories, without special permission, or to pay any debt then owing to any citizen of those states during the war. All citizens of northern states were warned to depart from the state within 24 hours. On Aug. 2 and 5 the confederate vessels in the harbor of Galveston fired at the blockading fleet, which in return fired at them and threw 3 or 4 shells into the city. This was represented as a bombardment of the city, and the French and English consuls formally protested against it. During the early part of the autumn a force of about 700 Texan soldiers penetrated into the southern portion of New Mexico, and captured a fort garrisoned by U. S. troops; they were subsequently reënforced by other parties from Texas, and attempted to conquer the whole territory; but in March, 1862, they were driven back with heavy loss and great suffering. Texas contributed a large number of troops to the confederate army; and one of its most successful generals, Ben McCulloch, long identified with the history of the state as a partisan leader, was killed at the battle of Pea Ridge, in Benton co., Ark.

TEXAS, a S. co. of Missouri, drained by Current river and affluents of the Gasconade; area, 1,250 sq. m.; pop. in 1860, 6,069, of whom 56 were slaves. The surface is hilly, with large forests of yellow pine, and the soil fertile along the streams. The productions in 1850 were 112,042 bushels of Indian corn, 2,848 of wheat, and 5,957 of oats. There were 15 saw mills, 3 churches, and 20 pupils attending a public school. Capital, Houston.

TEXEL, a Dutch island of the North sea, in the province of North Holland, separated from the mainland by the channel called Mars-Diep, about 2¼ m. broad; lat. of W. point 53° 3′ N., long. 4° 42′ E.; extreme length 14 m., breadth

6 m.; pop. 5,600. It contains several villages, the most important of which is Barg. The surface is low and a great deal of it marshy, but it is protected from inundations by the line of dunes or sand hills on the W. side, and strong dikes in other parts. The soil is remarkably fertile, and is chiefly occupied by pastures. Several naval engagements have taken place near this island.

TEZCOCO, or **Tezcuco**, a town of Mexico, in the state and about 16 m. E. N. E. from the city of Mexico, situated on the E. shore of the lake of the same name; pop. about 5,000. Woollen and cotton goods are manufactured, and a considerable trade is carried on. In ancient times Tezcoco was the second city in the kingdom. One of the palaces of Montezuma is said to have stood in the N. W. quarter, and in the S. part there are massive remains of 3 pyramids, each measuring 400 feet along the base of their fronts, which are thought to have been *teocallis*, devoted to human sacrifices.

THACHER, James, M.D., an American physician and author, born in Barnstable, Mass., Feb. 14, 1754, died in Plymouth, May 26, 1844. He commenced the study of medicine at the age of 16, and on the breaking out of the revolution was appointed surgeon's mate to Dr. John Warren in the general hospital at Cambridge; in 1778 he was made chief surgeon to the 1st Virginia state regiment, and in 1779 was transferred to the same post in a New England regiment. Throughout the war he kept a diary, and was thus enabled in 1834 to disprove the charges brought against our army and Gen. Washington by Mr. Buchanan, British consul at New York, of André's regimentals having been purloined. In March, 1783, he established himself in his profession at Plymouth, Mass., where he also gave some attention to the manufacture of salt and iron. In 1810 he first became known as an author by the publication of the "American New Dispensatory," which was long a standard work on pharmacy, medical chemistry, and materia medica. This was followed by "Observations on Hydrophobia" (8vo., 1812); "The Modern Practice of Physic" (1817; 2d ed., 1826); "The American Orchardist" (1822; 2d ed., 1825); "A Military Journal during the Revolutionary War" (1823; 2d ed., 1827); "American Medical Biography" (2 vols. 8vo., 1828); "A Practical Treatise on the Management of Bees" (1829); "An Essay on Demonology, Ghosts, and Apparitions" (1831); and other works.

THACHER, Peter, D.D., an American clergyman, born in Milton, Mass., March 21, 1752, died in Savannah, Ga., Dec. 16, 1802. He was graduated at Harvard college in 1769, and settled at Malden, Mass., in 1770. He soon attained a high reputation as a preacher, and received the name of the "silver-tongued Thacher." From Jan. 1785, till his death, he was the pastor of the Brattle street church in Boston. He was active and earnest as a patriot during the revolution, and his "Oration against Standing Armies," delivered at Watertown in 1776, has retained its reputation to the present time. In 1780 he was a member of the convention to form a constitution for the state, and for 15 years he was chaplain of one or both branches of the legislature. The university of Edinburgh conferred on him the degree of D.D. in 1791. He published 22 distinct works, among which were "Observations on the State of the Clergy in New England" (1783), and "Memoirs of Dr. Boylston" (1789).—**Samuel Cooper**, an American clergyman, son of the preceding, born in Boston, Dec. 14, 1785, died in Moulins, France, Jan. 2, 1818. He was graduated at Harvard college in 1804, and in 1811, when the Rev. Dr. Kirkland was elected president of Harvard university, Mr. Thacher was chosen his successor as pastor of the New South church in Boston. In 1817 he again visited Europe for the benefit of his health, but died of consumption soon after reaching Moulins. He was one of the association for conducting the "Monthly Anthology," and published a memoir of his friend, the Rev. Joseph Stevens Buckminster. After Mr. Thacher's death a volume of his sermons, with a memoir by the Rev. F. W. P. Greenwood, his successor in the ministry, was published.

THACKERAY, William Makepeace, an English novelist, born in Calcutta in 1811. Descended from an old family of Yorkshire that has given several rectors and scholars to the church of England, his grandfather was rector of Hadley in Middlesex, and his father was engaged in the civil service of the East India company. He was sent to England in his 7th year, had a view of Napoleon at St. Helena on his way, and was placed at the Charterhouse school in London. From the Charterhouse he went to the university of Cambridge, but did not take his degree; inherited a fortune of £20,000 on coming of age; chose art for his profession; and travelled and studied for several years in France, Italy, and Germany. In 1830–'31 he lived at Weimar, saw Goethe, purchased Schiller's sword, and delighted in making caricatures for children, some of which he found still preserved on revisiting the place in 1853. Reminiscences of his early art studies are interwoven into his fictions, many of which are illustrated by his own pencil; but he abandoned the project of becoming a professional artist soon after his return to England. His fortune was greatly reduced by losses and unsuccessful speculations, and before his 30th year he had set himself resolutely to literature as his vocation. His progress to general recognition was slow, though from the first he gave signs of his peculiar powers. He is understood to have written for the "Times" while it was edited by Barnes, and was certainly connected with other London journals. He contributed to "Fraser's Magazine," under the pseudonymes of Michael Angelo Titmarsh and George Fitz-Boodle, Esq., a variety of tales, criticisms, descriptive sketches, and verses, which proved his knowledge of the world, delicate irony, and mastery of a playful yet vigorous style. In this periodical appeared "The Great Hoggarty Diamond" in 1841, a thoroughly genial satire, with a tone at once of ridicule and of pathos. His earliest separate publications, also under the pseudonyme of "Titmarsh, literary cockney and sketcher," were "The Paris Sketch Book" (2 vols., 1840); "The Second Funeral of Napoleon" and "The Chronicle of the Drum" (1841), the latter being one of his finest metrical pieces; and "The Irish Sketch Book" (2 vols., 1843). None of these attained popularity, though the last has some of the happiest touches both of his pen and pencil. Meantime "Barry Lyndon," one of the best of his short tales, narrating the adventures of an Irish gambler and fortune-hunter, was contributed by Fitz-Boodle to "Fraser." The establishment of "Punch" in 1841 opened to him a new field, and his papers in this periodical speedily acquired peculiar distinction. His first series, under the signature of "The Fat Contributor," were followed by "Jeames's Diary," in which he looks at society from the footman's point of view, and "The Snob Papers," which gave to him an independent reputation as a social satirist, while they added to the success and dignity of "Punch." Many of his contributions were in verse, and showed his dexterous command of rhyme and of ludicrous orthography. A journey which he made to the East for his health suggested his "Notes of a Journey from Cornhill to Grand Cairo, by way of Lisbon, Athens, Constantinople, and Jerusalem, by M. A. Titmarsh" (1846); and he issued in the following year a small Christmas book entitled "Mrs. Perkins's Ball." Meantime "Vanity Fair," illustrated by himself, was published in numbers (1846-'8). When it began, his name was still generally unknown, but its popularity increased with every number, and at its close he was universally accounted with Dickens and Bulwer among the first British novelists. It is more strongly marked by special and peculiar genius than any other of his works, and is preeminent also in the delineation of character. Becky Sharp and Amelia Sedley, one the impersonation of intellect without affection, and the other of affection without intellect, are original characters, thoroughly and sagaciously drawn; the wickedness of the one is made amusing, and the weakness of the other pathetic; and cruel sarcasm, sparkling *persiflage*, and soft compassion succeed each other as he traces the desperate enterprise of Becky and half sneers at the unfaltering tenderness of Amelia. Upon the completion of "Vanity Fair" he published another Christmas book, "Our Street" (1848), to which a companion volume, "Dr. Birch and his Young Friend," was added in the following year. He had already begun another monthly serial, "The History of Pendennis, his Fortunes and Misfortunes, his Friends and his Greatest Enemy, with Illustrations by the Author." He aimed in this, his second great work, to describe the gentlemen of the present age, "no better nor worse than most educated men." Arthur Pendennis is a young fellow of warm feelings and a lively intellect, self-conceited and selfish, with no attractive points of character but a sense of honor and a capacity for love. He is carried away by absurd passions, falls a victim to vanity and weakness, takes to literature, becomes a man of the world and of fashion, and lives from hand to mouth without ambition, convictions, or any object beyond the chance requisitions and excitements of the day. The author invites us, "knowing how mean the best of us is," to give a hand of charity to him "with all his faults and shortcomings, who does not claim to be a hero, but only a man and a brother." A higher moral tone appears in the characters of Warrington and Laura. "Pendennis" was concluded in 1850, and his Christmas book of that year was a reprint from "Fraser" of a mock continuation of Scott's "Ivanhoe," entitled "Rebecca and Rowena." He published an original Christmas tale for the next year, "The Kickleburys on the Rhine," a clever and kindly satire on a proud and vulgar family travelling on the continent, but which a critic in the "Times" newspaper severely reviewed, charging the author with preferring to look only on the ugly side of human nature, and with overlooking the virtue and amiability that exist in the world. Mr. Thackeray repelled and ridiculed the accusation in an "Essay on Thunder and Small Beer," prefixed to the second edition of the volume. In the summer of 1851 he lectured in London before brilliant audiences on "The English Humorists of the 18th Century," sketching the lives and works of his predecessors in English fiction from Swift to Goldsmith. The lectures were repeated and admired in Scotland and America, were published in 1853, and have a peculiar charm from the sympathetic and social portraiture of his "fellows" of the past, mingling fine thoughts and amusing anecdotes. Ten thousand copies of a cheap edition were sold in a week. His attention had been called to the wits of Queen Anne's reign by studies preparatory to the "History of Henry Esmond, Esq., written by Himself" (1852), the scene of which is laid in that era. This is the most artistically complete and the noblest in tone of all his works, while it also admirably copies the manners, sentiment, and diction of the Queen Anne period. The main characters, Esmond and Beatrix, are among his best creations—the former a strong, high-minded, disinterested, and impulsive cavalier and Jacobite, and the latter perhaps the finest picture of splendid, lustrous physical beauty ever given to the world. It is a magnificent and sombre romance, comparing with his other works as "The Bride of Lammermoor" to the others of Scott. His third serial novel was "The Newcomes: Memoirs of a Most Respectable Family, edited by Arthur Pendennis, Esq.," the issue of which was completed in 1855. In this the elements are more kindly mixed than in any other of his fictions; there is a softening of tone, a predominance of feeling over sarcasm, an avoidance of the darker tints and baser qualities which he had previously favored as themes for smiling raillery. The characters of Clive and Ethel are less vivid than some of his others, the story lingers, but the whole is redeemed by its prevalent genial spirit, and especially by the moral beauty of the life of Colonel Newcome, and by his death in the Charterhouse, than which there is nothing more touching in romantic literature. His earlier contributions to "Fraser," "Punch," and other journals were now collected under the title of "Miscellanies," and his admirers were interested in tracing the gradual development of his genius. The same peculiar power, at once cynical and cheery, and the same clear, idiomatic, and effective style, mark the best of his earlier burlesques and his later elaborate productions. The success of his lectures on the humorists induced him to prepare another series, "The Four Georges," which were first delivered in the principal cities of the United States in 1855–'6, and afterward in London and most of the large towns in England and Scotland. The courts and characters of the Hanoverian monarchs furnished abundant occasion for satire; the third George alone, especially in the misfortunes of his last years, was discussed with forbearance and described with pathos; and the literature, society, morals, and manners of the time were briefly illustrated. Thackeray had entered himself at the Middle Temple and been called to the bar in 1848, but with no intention of following the legal profession. In 1857, one of the seats for the city of Oxford in the house of commons having been declared vacant, he offered himself as the liberal candidate for the representation, and declared himself an advocate of the ballot and of the diminution of the political influence of the hereditary aristocracy, but was defeated by Mr. Cardwell, by a majority of 67 votes. Before the close of the year he had begun another serial, "The Virginians," the scene of which is laid in the last century during the later years of George II. and the earlier years of George III., and in which Chesterfield, Garrick, and Johnson, the gaming table and coffee house, Washington, Wolfe, Braddock, and the impending American war, are introduced together with fictitious personages and events. The work holds an intervening place between "Esmond" and "Pendennis," some of its characters being descendants of those in the former, and ancestors of those in the latter. It is rather loosely constructed, but abounds in philosophic humor and racy apophthegms. In Jan. 1860, appeared the first number of the "Cornhill Magazine," under the editorial charge of Thackeray, which soon attained a circulation of some 100,000 copies. In this periodical he has published "Lovel the Widower," the least esteemed of his later novels, and his lectures on the four Georges; and he is now (1862) producing in its pages a new romance entitled "The Adventures of Philip on his Way through the World."—The characters of Thackeray are generally described, not by their great qualities or leading habits, but by small peculiarities, affectations, or weaknesses. The literary barristers in "Pendennis," for example, do not appear as having much to do with either law or literature; Warrington, who produces the impression of being a man of powerful thought, does nothing to give it scope; we learn it only from his conduct in the commonest affairs of life. He shows no more of his personages than might be gathered from intercourse in society, paints men almost entirely in their moments of relaxation, relates their behavior, and displays so much of their feelings as their demeanor, actions, and voice can bear witness to. His aim is not to give clues to a character, but to reproduce the image which the whole phenomenon of society has impressed on his mind. To read him is therefore like meeting and mixing with the individuals in actual life. His field of survey is not very broad, his favorite position being the debatable land between the aristocracy and the middle classes. He knows mankind from dining rooms and drawing rooms, club rooms and country houses. Without any thorough acquaintance with English provincial life, or with the habits and feelings of the lower classes, he has seen a good deal of soldiers, artists, and men of letters, and has a profound knowledge of footmen and men about town. From false taste, or from some deeper infirmity, he inclines to give prominence to blots, parade defects, hold up the most petty and ignoble sides of all things, and find the comic aspect of wickedness and misery. But the unmistakable irony of his realistic descriptions necessarily implies and suggests an ideal of humanity from which his heroes are deviations; and from this moral antithesis of the actual and ideal springs the peculiar charm of his writings, the mingled gayety and earnestness, sentiment and cynicism, pathos and sarcasm, tenderness and malignity, with which he regards human life.

THAER, Albrecht, a German agricultural writer, born in Celle, Hanover, May 14, 1752, died at Mögelin, near Potsdam, Prussia, Oct. 26, 1828. He studied medicine at Göttingen, and after a visit to England published "Introduction to the Knowledge of English Agriculture" (3 vols. 8vo., Hanover, 1798), which has passed through several editions. In 1799 he founded an agricultural school at Celle, and in 1806 the king of Prussia granted him a large tract of land, which he exchanged for another at Mögelin, where in 1807 he founded a practical school of agriculture, which in 1810 was constituted the royal school of agriculture. At the reorganization of the Prussian government in 1807, he was appointed a councillor of state, and carefully revised the land laws of the kingdom; and in 1810 he was appointed professor of agriculture in the university of Berlin. He published agricultural periodicals under various titles from 1798 to 1824. His great work, "The Rational Principles of Agriculture" (4 vols., Berlin, 1809–'10), has been translated into English and almost all the other languages of Europe. He received orders of knighthood from Russia, Prussia, Saxony, Bavaria, and Würtemberg; and agriculturists regard him as the first to apply the principles of natural science to the practice of agriculture.

THAIS, an Athenian *hetaira* or courtesan, who accompanied Alexander the Great on his expedition to Asia. The celebrity connected with her name is chiefly due to the fact that she is said to have instigated Alexander to set fire to the citadel of Persepolis, the residence of the Persian kings, in revenge for the injuries done to her native city by Xerxes; but this anecdote, though immortalized by Dryden, is probably untrue, as we know on the authority of Arrian that it was his intention to sack the place and burn the citadel on grounds of state policy. After the death of Alexander, Thais became the mistress of Ptolemy Soter, and, according to Athenæus, was afterward married to him. She was celebrated for wit and repartee, and many anecdotes are recorded of her talent in those respects.

THALBERG, Sigismond, a Swiss pianist, born in Geneva, Jan. 7, 1812. He is the natural son of Count Dietrichstein, and while a boy was placed under the instruction of Hummel, whom he subsequently surpassed in firmness of touch and grace of expression. At 15 he began to be known in the concert rooms, and soon afterward published his first compositions. Since 1830 he has been constantly employed in giving concerts in the chief cities of Europe and America, and he divides with Liszt the honor of standing at the head of living performers on the pianoforte. His playing is distinguished by precision, delicacy, and finish, rather than by the production of surprising effects; but his chief merit, both as a performer and a composer, consists in his successful attempts to combine the elements of song and harmony and of brilliant execution, as exemplified respectively in the schools of Mozart and Beethoven and of Clementi. In connection with this movement he has discovered many ingenious combinations for the fingers, whereby the song or melody can always be heard strongly accented in the midst of rapid passages and complicated forms of accompaniment. Among the productions by which Thalberg and his method have acquired their celebrity are a series of fantasias of great beauty and brilliancy, including those on themes from *Don Giovanni*, *Robert le Diable*, *L'elisir d'amore*, *Les Huguenots*, *La donna del lago*, and *Mose en Egitto*, the performance of any one of which by the composer may be said almost to realize the perfection of pianoforte playing. His "Studies" for the pianoforte are also highly esteemed by instructors. In 1851 he produced at London an opera entitled *Florinde*, founded on a libretto by Scribe, and which failed to attract much attention. In 1845 he married a daughter of Lablache.

THALER (Dutch, *dahler;* Dan. and Swed. *daler*), a coin and money of account of Germany, Austria, Holland, Belgium, Denmark, Sweden, and Norway. Silver coins of an ounce weight were struck in the early part of the 16th century at Joachimsthal, a valley in Bohemia, whence the name. (See Dollar.) Other countries after a time began to coin thalers, but not always of the same value, and hence originated the *Laubthaler* or leaf dollar, the *Philippsthaler*, the Swedish copper dollar, &c. In most of the countries of Europe the royal or imperial mints coined thalers, hence called *rigsdaler*, *riksdaler*, or *rigsthaler*, that is, dollar of the realm. These varied in value according to the amount of alloy. In Austria the specie rigsthaler is worth $1.01; in Prussia and Brunswick, 72 cts.; in Hanover, 72.2 cts.; in Hesse-Darmstadt, 72.3 cts.; in Saxony, 72.2, and those coined from 1829 to 1836, $1.00.8; in Denmark and Norway, $1.09; in Sweden, coinage of 1830–'38, $1.10.4. As money of account there is still greater diversity of values, owing to the depreciation of the issues of the national banks or treasuries. In Sweden the *rigsdaler banco* is 39½ cts., and the *rigsdaler rikemynt*, now the authorized money of account, is 26½ cts. In Denmark the *rigsbank daler* is 54.7 cts. In Germany generally the *thaler* of account is reckoned at 69 to 72 cents American currency.

THALES, a Greek philosopher, and one of the 7 wise men, born in Miletus, Ionia, about 636 B. C., died probably about 546. He took an active part in the political affairs of his native country, and before Ionia fell under the Persian yoke he advised a federation of all the Ionian states. He visited Crete and Egypt, and acquired in the latter country an acquaintance with mathematics and geometry. Various physical discoveries are attributed to him. He measured the height of the Egyptian pyramids by observation of the time at which a shadow equalled in length the height of the object; and he is said to have computed the sun's orbit, to have fixed the length of the year at 365 days, and to have been the first among the Greeks to predict eclipses, though very vaguely. In philosophy he is generally considered the founder of the Ionian school. His speculations were principally upon the nature of the universe. He taught that all things are instinct with life, and that the origin of all things is water. He left no written works, but many of his sayings are recorded by Diogenes Laërtius.

THALIA, in Greek mythology, the muse of comedy and idyllic poetry. She is generally represented with the comic mask, a shepherd's staff, or a wreath of ivy.

THAMES, a river of Connecticut, formed by the junction of the Quinebaug, Shetucket, and Yantic rivers at the city of Norwich, and flowing thence S. about 14 m. to Long Island sound, which it enters below New London. It is a wide and beautiful river, navigable for large vessels to Norwich, and has an excellent harbor at its mouth. The streams which form it possess numerous valuable mill sites, and the large amount of manufactured goods from the factories on their banks make the Thames an important avenue of commerce.

THAMES, a river of Canada West, flowing through a fertile country in the peninsula formed by Lakes Huron and Erie, and after a S. W. course of about 160 m. discharging its waters into Lake St. Clair. It is navigable for boats from its mouth to Chatham, and has several considerable towns on its banks. At the Moravian settlement on this river, Oct. 5, 1813, the battle of the Thames was fought between the British under Gen. Proctor, with an auxiliary force of 2,000 Indians led by the famous Indian chief Tecumseh, and the American forces under Gen. W. H. Harrison. The American cavalry, commanded by Col. Richard M. Johnson, opened the battle, and defeated the enemy. Tecumseh was killed, and 600 prisoners, 6 pieces of cannon, and large quantities of stores were taken by the Americans.

THAMES, or Isis, the largest and most important river of England. Its source, called Thames Head, is in the Cotswold hills, about 3 m. S. W. from Cirencester. In the first 30 m. of its course it receives 3 small streams, the Churnet, the Coln, and the Lech, and below Lechlade becomes navigable for barges; from Lechlade its course is first E. and then N. N. E. and S. S. E. to Oxford, through a level country, receiving on its way the Windrush and the Cherwell. From Oxford to Reading it flows first S. S. E. and then S. E., receiving the waters of the Thame and the Kennet; thence making a considerable circuit to the N. by Henley, Great Marlowe, and Maidenhead, it turns eastward to Windsor, then makes a detour southward by Staines and Chertsey to Kingston, where it turns N., and, passing Richmond, reaches Brentford, whence its course is nearly due E. to its mouth. From Brentford it passes by Putney, Hammersmith, and Chelsea to London, receiving in its course the Loddon, Colne, Mole, Cran, Brent, and Wandle, all small streams. From London to its mouth, a distance of 54 m., the Thames is a large stream navigable for vessels of 700 or 800 tons, and for vessels of 1,400 tons to Blackwall, 6 m. below. It is 290 yards wide at London bridge; at Woolwich, 9 m. below, 490 yards; at Coalhouse point, 20 m. further down, 1,290 yards; at the Nore, 6 m.; and at its mouth, 18 m. Below London it receives the Ravensbourne, Roding, Darent, and Medway. Its tide is perceptible as far as Teddington, 72 m. above its mouth. Its commercial importance is increased by the canals which connect it with other navigable waters of England, viz.: the Thames and Severn canal, connecting it with the Severn, which discharges into Bristol channel; the Oxford canal, which connects it with the grand canal system of the central counties; the Wilts and Berks and the Kennet and Avon canals, which connect it with the Avon and the Severn; the Wey and Arun and the Basingstoke canals, connecting it with the Sussex coast; the grand junction, the Regent's, and the Paddington canals, the first of which connects the Brent with the Oxford canal, and the other two encircle the N. and E. sides of the metropolis and greatly facilitate the transportation of goods. The whole course of the Thames is 220 m. It forms the boundary between Gloucestershire and Wiltshire, between Berkshire and Oxfordshire and Buckinghamshire, between Middlesex and Surrey, and between Essex and Kent. The commerce of the Thames is surpassed probably by that of no river in the world. Its waters at and below London are crowded with vessels of all sizes and freighted with the products of all climes. Its vast and commodious docks for the discharge of goods from shipboard are described in the article Dock. It is crossed at and above London by numerous bridges, while the tunnel which passes beneath its waters from the Middlesex side to Rotherhithe on the Surrey side, completed in 1840, is one of the most remarkable triumphs of Sir M. I. Brunel's engineering ability. (See London, vol. x. p. 655.)

THANE, the name of an ancient rank among the Anglo-Saxons, derived from *thegnian*, to serve, and originally applied to the followers of kings and chieftains. In the later age of Anglo-Saxon rule there were two classes of thanes, those of the inferior sort being simply called thanes, those of the superior king's thanes. The former were exceedingly numerous. In rank the thane was below the *ealdorman* or earl, but the possession of landed property was essential to his dignity. The rank was attainable by all, even the servile; and the laws state the requisites to be the possession of 5 hides of land, a church, a kitchen, a bell house, a judicial seat at the burgh gate, and a distinct station in the king's hall. Sharon Turner ("History of the Anglo-Saxons") thinks that the superior thanes were those subsequently called barons, as the terms are synonymous in the laws of Henry I., and that the inferior thanes were those who after the conqueror's time were termed knights.

THANET, Isle of, an island of England, on the N. coast of Kent, separated from the mainland by branches of the river Stour called the Stour-wantsome, the Mele-stream, and the Nethergong-wantsome; extreme length 10 m., breadth 5 m.; area, 26,500 acres; pop. in 1851, 31,798. The island contains several towns, the most important of which are Ramsgate, Margate, and Broadstairs. The N. E. point of the island is called the North Foreland, and has a lighthouse on its extremity, the light of which is visible at the distance of 22 m. The surface, elevated and nearly level, is generally rich and fertile, and cultivated with great care.

In the time of the Romans the channel on the N. W. side, now almost completely closed, was from 1½ to 4 m. wide, and was used as the main passage for vessels proceeding toward London; and it continued to be navigable for vessels of considerable size till the time of the Norman conquest. The island was then nearly circular, but it has been gradually washed away till it is now an irregular oval. This wasting away is still going on, and the average annual loss is estimated at 2 feet on the N. side, and 3 feet on the S. between Ramsgate and Pegwell bay.

THASOS, an island of the Grecian archipelago, belonging to Turkey, lying off the S. coast of Roumelia, about 30 m. N. N. E. from Mt. Athos, nearly circular in form; area, about 85 sq. m.; pop. 6,000. The centre of the island is occupied by Mt. Ipsario, a summit 3,428 feet above the level of the sea, and thickly covered with fir trees. The soil is not fertile, and the inhabitants, scattered in 12 small villages, do not produce grain enough for their own consumption. The vine was formerly cultivated, and the wine of Thasos was celebrated, but little or none is now produced. All trace of its ancient gold mines, which yielded a large revenue, has disappeared.—Thasos was an island of great importance in ancient times. It was settled by the Phœnicians, led by Thasos, the son of Agenor, who are said to have come thither in search of Europa 5 generations before the birth of the Grecian Hercules. In the latter part of the 8th century B. C. it was colonized by settlers from Paros, who in the course of 2 or 3 generations became a powerful colony, and obtained possessions and mines on the mainland as well as those on the island. The wealth of the Thasians excited the jealousy and covetousness of their neighbors. Darius (492 B. C.) commanded them to dismantle their fortifications and remove their ships to Abdera, and they did not dare to disobey. When Xerxes marched through Thrace on his way to Greece, the Thasians on account of their possessions on the mainland were compelled to provide for the Persian army as it marched through their territories, and their expenditure was 400 talents ($460,000). After the defeat of the Persians Thasos became a member of the confederacy headed by the Athenians; but in 465, in consequence of disputes between the Thasians and Athenians, the latter sent Cimon with a large army against the island, which he subjugated and despoiled, after a siege of more than two years. Its subsequent history is one of almost constant conflict with Athens, to which it was nominally subject, until the time of the Roman wars, when it submitted to Philip V. of Macedon; but after the battle of Cynoscephalæ (B. C. 197) it became a free state. After the capture of Constantinople by the Turks it fell into the hands of the Venetians. Some remains of its ancient city Thasos still exist.

THATCHER, Benjamin Bussey, an American author, born in Warren, Me., Oct. 8, 1809, died in Boston, July 14, 1843. He was graduated at Bowdoin college in 1826, and studied law, but devoted himself to literature. In 1836 he visited England for his health, and spent two years there. He left several unpublished works, and numerous poems, essays, and fugitive pieces. His published works are: "Biography of North American Indians who have been distinguished as Orators, Statesmen, Warriors," &c. (2 vols. 18mo., New York, 1832); "Traits of the Boston Tea Party" (18mo., New York); "Traits of Indian Manners, Character," &c. (2 vols. 18mo., New York, 1835); "Tales of the American Revolution" (18mo., New York); and "Memoir of Phillis Wheatley" (18mo., Boston, 1834).

THAYER, Sylvanus, an American officer of the engineer corps, born at Braintree, Mass., in 1785. He was educated at Dartmouth college, and at the U. S. military academy at West Point, where he was graduated in 1808 as 2d lieutenant of engineers. His first service was that of aiding in the construction of the fortifications in Boston harbor. In the war of 1812 he served on the Canadian frontier, and subsequently at Norfolk, Va., where he won the brevet of major. In 1815 he was sent by the government with Col. McRae to France and Belgium, to examine the fortifications in those countries. On his return in 1817 Major Thayer was appointed by President Monroe superintendent of the West Point military academy, where he remained till 1833, when he was appointed to construct the defences of Boston harbor. In 1838 he was made lieutenant-colonel, having already been colonel by brevet since 1833. From 1857 till 1859 he was temporary chief of the U. S. corps of military engineers. In Feb. 1863, he was placed on the retired list.

THEATINES, the name of a religious order in the Roman Catholic church, founded in 1524 by Gaetano di Thiene (died in 1547, canonized in 1669), Giovanni Pietro Caraffa, bishop of Theate (afterward pope under the name of Paul IV.), Bonifazio di Colle, and Paolo Consiglieri. After the first named of their founders, they were sometimes called Cajetans; their common name, Theatines, is derived from the episcopal see of the second of the founders. The founders received the papal approbation of their new institution in the very year of its foundation, 1524, and with it the privileges of the regular canons of Lateran and the right of electing a superior every third year. Their members took the three usual monastic vows, and their original object was to labor for a reformation of the clergy. From Italy they spread to Spain, Poland, France, and Germany, and some members of the order were sent as missionaries to Tartary, Georgia (in the Caucasus), and Circassia. Having gained a considerable extension, they were ordered by Pope Paul V. to choose, instead of a superior, a general, for 6 years; but later the general's term of office was limited to 3 years. At the end of the 16th century the order had disappeared in all countries except Italy, where in 1860 it had 9 houses left.—There were also two communities of Theatine nuns (one of them a congregation of hermits), both founded by Ursula Benincasa, the one in 1583, the other in 1610. Neither of them had ever more than two establishments, and at present both are extinct.

THEATRE (Gr. ϑεατρον, a seeing place), a building in which plays or dramas are represented. The first theatres of the Greeks, who were the founders of the drama in our sense of the word (see DRAMA), were exceedingly rude affairs. Thespis is said to have acted his plays in a wagon, and in the time of Æschylus the performances took place upon temporary wooden scaffolds, one of which having broken down during a representation in which Æschylus and Pratinas were rivals (500 B. C.), the Athenians were induced to build the great theatre of Dionysus (Bacchus), the Lenaion, the first permanent structure of the kind of stone. It was about 160 years in building, and in the mean time other theatres had been erected in many parts of Greece and Asia Minor. The discovery of the remains of the theatre of Bacchus at Athens by Prof. Strack, royal architect of Prussia (who is still, in May, 1862, prosecuting his excavations), proves the descriptions of it previously accepted to be very erroneous. The seats of the spectators, comprising the ϑεατρον proper, rose one above another in arcs of concentric circles, each row forming only about ½ of a circumference, instead of ¾ as hitherto supposed. The space immediately in front of the spectators, corresponding nearly to the modern pit or parquet, was called the orchestra, and was appropriated to the chorus. It was floored with boards, and in the centre of it stood the ϑυμελη or altar of Dionysus, upon a raised platform which was sometimes occupied by the leader of the chorus, the police, the flute player, and the prompter; the two last were placed on the side next the stage, and concealed from the spectators by the altar. The stage was behind the orchestra and raised above it, and the chorus, whenever they had to take a part in the real action of the drama, ascended to it by steps. The back was closed by a wall called the σκηνη (Lat. *scena*); the space between the scena and the orchestra was known as the proscenium; and the part nearest the audience, where the actors stood when they spoke, was the λογειον. There was no scenery, properly so called, but the scena was architecturally decorated and made to represent as far as possible the locality in which the action was going on. It had an entrance in the centre called the royal door, through which the principal characters made their appearance, and doors on the right and left for the subordinate personages. The plays of Æschylus and Euripides, it is true, seem to require frequent changes of scene, but probably the changes were rather hinted at than actually made; they perhaps consisted merely in turning the περιακτοι (Lat. *versuræ*) or "wings," which were prism-shaped frames moving on pivots at each side of the proscenium. The whole stage was never concealed from the spectators; there is mention of a curtain, which instead of being drawn up was lowered through a crevice in the stage, but it covered only the background, or according to some authorities the wings. The machines for producing supernatural effects must have been numerous and elaborate, but are now imperfectly understood. They included the "Charonian steps," by which shades ascended from the lower world; the μηχανη, by which gods and heroes were represented passing through the air; and the ϑεολογειον, an elevated place above the scena, where the deities appeared in full majesty. Neither the stage, the orchestra, nor the auditorium was roofed, but there were porticos running around the building, to which the people retreated in case of rain, and awnings were sometimes used to ward off the heat of the sun, for the performances always took place by daylight. The vast size of the ancient theatres, intended as they were to accommodate almost the entire population of a city at each performance, was their most serious defect. It being impossible for the human voice unaided to reach such a vast multitude, metallic vases were placed under the seats to serve as reflectors of sound, and the actors wore masks with metallic mouth-pieces to answer the purpose of speaking trumpets. Thus all expression both of voice and countenance was lost. The spectators were seated according to their rank. A price was charged for admission, at least until the performance was pretty far advanced; but from the time of Pericles the poorer class and subsequently all the citizens were admitted at the cost of the public treasury. Whether women were ever present has been much disputed; it seems almost certain, however, that they were allowed to witness tragedies. The actors were invariably males. The performances began early in the morning, and not unfrequently lasted 10 or 12 hours.—The Roman theatres were copied from those of the Italian Greeks. They were at first temporary structures of wood, which were sometimes extravagantly magnificent. One built by M. Æmilius Scaurus (58 B. C.) was capable of seating 80,000 people, and the scena was decorated with 3,000 statues and 360 columns in 3 stories, the lowest of white marble, the middle one of glass, and the uppermost of gilt wood. The first stone theatre was pulled down before it was finished at the instance of P. Scipio Nasica (155 B. C.), on the score of public morality. In the Roman theatre women performed in interludes and mimics, but not in regular dramas. The seats of the spectators and the orchestra did not form more than a semicircle, the diameter of which was identical with the front of the stage; and the orchestra, instead of being appropriated to the chorus, was occupied by the senators, foreign ambassadors, and other distinguished persons. There was nothing corresponding to the ϑυμελη, or altar, of Dionysus. The depth of the stage was proportionally somewhat greater than in the Greek theatre, being in the latter about ⅐ of the diameter of the orchestra, and in the Roman ¼. Thus, in the theatre of Dionysus at Athens the diameter of the orchestra (and consequently the width of the available part of the stage) was 72 feet, and the depth of the stage only a little more than 10 feet. A Roman stage of the same width would have been 17½ feet deep. The following are some of the largest ancient theatres whose ruins are now known:

Location.	General diameter, feet.	Diameter of orchestra, feet.
Ephesus	660	240
Tralles	540	150
Rome (theatre of Marcellus)	517	172
Miletus	474	224
Sparta	458	217
Syracuse	440	....
Dramyssus	440	78
Aspendus	400	25 rows of seats
Cnidus	400	....
Phellus	400	width of scena, 150

—Between the decline of the ancient and the rise of the modern drama there is a long interval, in which the nearest approach to theatrical performances is found in miracle plays, mysteries, and interludes. These were given for the most part in convents, colleges, and churches, or in the halls of palaces and castles. The first theatres in France were built for miracle plays. As early as 1548, however, the confraternity of the Trinity had a theatre in Paris in which they were licensed by the parliament to perform only "profane pieces of a lawful and honest character." So late as 1561 the French had no scenery, and the performers remained on the stage during the whole representation. The first Italian theatre is said to have been erected at Florence in 1581, by Bernardo Buontalenti, but it was probably not public. About the same time Palladio made an attempt to revive the classical theatre in his celebrated *teatro Olimpico* at Vicenza, but with reduced proportions. It is of semi-elliptical form, with the stage on the longer axis of the ellipse, and the scena has the ancient permanent architectural background, with avenues seen through the openings in it, the apparent length of which is increased by artificial perspective. From 1618, when a theatre was built at Parma by Aleotti, the modern arrangement began to prevail. By narrowing the stage opportunity was given for the use of painted scenery, and by increasing its depth for the introduction of a variety of complicated machines and the production of spectacular pieces.—In England there were regular companies of players as early as the reign of Edward IV., long before there were regular play houses. Churches, universities, private houses, and the yards of inns served at first for their performances. Probably the first play house was the London "Theatre," built before 1576; the Curtain in Shoreditch, and the theatres in Blackfriars and Whitefriars, were built near the same time. In Shakespeare's day London had 8 "private" and 4 "public" theatres, the difference between which is not clearly understood. His own plays were produced at the house in Blackfriars and at the Globe, both of which belonged to the same company, known as his majesty's servants. The Globe was a hexagonal wooden edifice, partly open at the top and partly thatched. In the middle was probably an uncovered court where the common people stood, and around 3 sides ran galleries or "scaffolds," under the lowest of which were enclosed boxes called "rooms." The prices of admission ranged from a penny or twopence to a shilling. The performance commenced at 3 o'clock; in the private theatres it took place by candle light. The stage at this period was strewed with rushes and concealed by curtains, which opened in the middle and drew backward and forward on an iron rod. In the background there was a balcony or upper stage, likewise curtained, from which parts of the dialogue were spoken, and at each side of this balcony there was a private box. In the private theatres the wits, critics, and other persons of consequence were furnished with seats on the stage. Movable scenery was first used in a regular drama on a public theatre by Davenant in 1662, though something of the sort had been arranged at Oxford by Inigo Jones as early as 1605, on the occasion of an entertainment given to James I. Shakespeare had no other scenery than tapestry hangings and curtains, but the use of stage machinery of a more or less elaborate nature is as old as the drama itself. Women first appeared upon the English stage about the period of the restoration.—The first theatre in America was opened at Williamsburg, Va., Sept. 5, 1752. Others followed at Annapolis, Md., and in Nassau street, New York (1753), Albany (1769), Baltimore (1773), Charleston, S. C. (1774), Newbern, N. C. (1788), and Boston (1792). The largest in the United States are now the opera houses of New York, New Orleans, Cincinnati, Boston, Philadelphia, and Brooklyn. Modern theatres, except those intended for opera, are now almost always small. The expenses are thus diminished, and all the audience are brought within easy seeing and hearing distance. It has been found by experiment that the human voice, moderately exerted, can be distinctly heard about 90 feet in front of the speaker, and 75 feet each side. In an opera house the dimensions may be vastly increased, as singing can be heard at a greater distance than speaking, and it is not requisite to bring the audience near enough to see the facial expression of the performers. The small acting theatres of New York have been considered the best of their kind in the world; and the opera house of the same city, though defective in its arrangement of seats, is one of the handsomest in existence. The best form for the auditorium is either three fourths of a circle, or a semicircle with divergent ends. The latter affords the best opportunities for seeing, but involves either a disproportionate and inconvenient width of stage, or a considerable useless space on each side of the proscenium. Most American theatres differ from those of Europe in having no private boxes, except a few on and adjoining the proscenium, by which means a vast gain is effected in the capacity of the house; they are also generally better lighted. The following are some of the largest theatres in the world, with the number of spectators they are capable of accommodating:

St. Petersburg, Bolshoi theatre	5,000
New York, academy of music	4,700
Milan, La Scala	4,000
London, New Pavilion, Whitechapel	3,700
" Drury Lane	3,500
" her majesty's, Haymarket	2,500
" Italian opera, Covent Garden	2,000
Naples, San Carlo	3,600
Venice, La Fenice	3,000
Philadelphia, academy of music	2,850
Turin, theatre royal	2,500
Florence, La Pergola	2,500
Munich, royal theatre	2,500
Brooklyn, academy of music	2,200
Paris, Académie impériale de musique	1,950
" Ambigu comique	1,900
" Porte St. Martin	1,800
" Théâtre Italien	1,700
" Théâtre Lyrique	1,700
" Odeon	1,650
" Opéra comique	1,500

—In China every little village has its theatre, and each great town has several. They have no scenery and no auditorium, the spectators remaining in the open air. There is of course no charge for admission, the expenses being defrayed sometimes by mandarins or other rich persons, but more frequently by associations formed for the purpose among the inhabitants of the neighborhood. The actors are invariably strollers. In Japan the histrionic art has made more progress; the stage is decorated with scenery, and the audience are furnished with seats. In neither country are women allowed to perform.

THEBES (called No or No-Ammon by the Hebrews, and Diospolis the Great by the later Greeks and the Romans), the capital of Upper Egypt, and for a long time of the whole country, reputed in antiquity the oldest city of the world. It stood near the centre of the Thebaid, extending on both sides of the Nile to the mountain chains which enclose the valley. The city, according to Strabo, covered the entire plain, an area above 5 m. in length and 3 m. in breadth, at least equal in extent to the site of ancient Rome or modern Paris. Diodorus estimated its circuit at 140 stadia or about 17 m., and Sir Gardner Wilkinson infers from its ruins that its length was 5¼ m. and its breadth 3 m. The annual depositions of the Nile have permanently raised the soil, and buried the base of every monument; the layers around one of the colossal sphinxes are found by excavation to make a depth of 18 feet above the rubbish which occurs universally as the foundation of ancient Theban buildings. From some chronological inscriptions the rate of deposition appears to be 5 inches in every 100 years; so that, assuming this rate to have been uniform, the substructure of the sphinx would have been laid nearly 2,500 years before the Christian era. This calculation, until further investigation, cannot be confidently received.—The monarchs of Thebes expelled the shepherd kings from Memphis and Lower Egypt about 1500 B. C., and made their city the capital of the whole country during several centuries. Amenophis I., the first king of the 18th dynasty, carried his arms into Syria and Ethiopia; Thothmes I. founded some of the most magnificent Theban edifices; Thothmes III. made his kingdom unrivalled in arts and in arms, and adorned all the cities of the Thebaid with architectural monuments; and Amenophis III. extended the Theban supremacy, and began the structures at Luxor. Rhamses I., Sethos, and Rhamses II., of the 19th dynasty (founded about 1324 B. C.), represent, according to Wilkinson, the Augustan age of Egypt, when its sway was the widest, and its most superb monuments were erected. The decline of Thebes began under the 21st dynasty; there was an Ethiopian revolt; Lower Egypt gradually resumed its preëminence, but with diminished power during the rise successively of the Assyrian and Persian empires; and when Cambyses conquered Egypt (525 B. C.), the upper capital fell without a struggle, and ceased from that time to be a metropolitan city. The greatness of Thebes was known to Homer, who speaks of its 100 gates and 20,000 war chariots; Diodorus was informed that Sesostris (Rhamses II., according to Wilkinson) took the field with 600,000 infantry, 24,000 cavalry, and 27,000 chariots; but after its destruction by Ptolemy Lathyrus (86 B. C.), it lost all its political and commercial importance, though it remained the sacerdotal capital of the worshippers of Ammon. The lucrative trade which had contributed to its prosperity had found new channels after the foundation of Alexandria; and as a Macedonian and Roman prefecture it took little part in the affairs of Egypt. It was desolated successively by Christians of the Thebaid, in their zeal against idolatrous monuments, by barbarians from Arabia and Nubia, and by the Saracens; after whose invasion its name scarcely occurs for many centuries.—The ruins of Thebes, which are among the most magnificent in the world, are found at the modern villages of Luxor and Karnak on the eastern bank of the Nile, and Goorneh and Medinet-Aboo on the western. The eastern quarter of the ancient city contained the mass of the population, while the western side was covered with temples and palaces and their avenues of sphinxes, and with the rock-hewn tombs of the kings. The principal structures at Goorneh are the palace temples Menephtheum and Remeseum. The former, approached by an avenue 128 feet in length, has pillars in the oldest style of Egyptian architecture and remarkable bass-reliefs. The latter, the Memnonium of Strabo, which for symmetry of architecture and elegance of sculpture may vie with any other

Egyptian monument, occupies a series of terraces communicating with each other by flights of steps. Its entrance is flanked by two pyramidal towers; its first court has a double avenue of columns on either side, and in the area a pedestal on which was a syenite sitting colossus of Rhamses; its second court has walls covered with sculptures representing the wars of Rhamses III., and Osiride pillars which are doubtless the monolithal figures of 16 cubits high described by Diodorus; the third stairway, from the foot of which Belzoni took the head of a royal statue of red granite, now in the British museum and known as the young Memnon, conducts to a hall used for public assemblies, with columns and walls covered with civil and religious sculptures; and beyond the hall extended 9 smaller apartments, two of which remain, supported by columns, one of them being the sacred library or "dispensary of the mind" mentioned by Diodorus. Among the other monuments in this vicinity are two colossal statues, 60 feet in height, the wonder of the ancients, one of them known as the vocal Memnon. (See MEMNON.) The village of Medinet-Aboo stands upon a lofty mound formed by the ruins of the most splendid temple palace in western Thebes, the Thothmesium, connected with the palace of Rhamses by a dromos 265 feet in length. The sculptures in the latter are of singular interest, being the only examples that have been found of the decoration of the private apartments of an Egyptian palace. The whole sweep of the Libyan hills, for the space of 5 miles and to the height of 300 feet from Goorneh to Medinet-Aboo, is full of sepulchres, excavated in the native calcareous rock. This was the necropolis of the whole city, no tombs existing on the eastern side. The mummies are laid in rows by the side of or tiers above each other, but never stand erect. The tombs of the lower classes are unsculptured, but abound in mummies of sacred animals. The royal sepulchres are in the valley of Bab-el-Melook, the most spacious and highly adorned belonging to those monarchs who enjoyed a long reign. Here repose the Theban Pharaohs from the 18th to the 21st dynasty, but only 3 complete catacombs have been discovered. The monuments, as also those in the separate burial place allotted to the queens, are chiefly interesting from their hieroglyphics.—Still more remarkable are the ruins on the eastern bank of the river, in the villages of Luxor and Karnak. At Luxor the most striking monuments were two beautiful obelisks of red granite, covered with a profusion of hieroglyphics, one of which has been removed to the Place de la Concorde at Paris. Behind them are two sitting statues of Rhamses, one 39 feet high, but now covered to the breast with accumulations of earth and sand. Two courts and a series of apartments, connected and surrounded by colonnades and porticos, extend beyond. The road from Luxor to Karnak lies through fields of *halfeh* grass, though they were once united by an avenue of andro-sphinxes. The great palace temple of Karnak stands within a circuit wall of brick 1,800 feet long and somewhat less broad. It was approached by an avenue of crio-sphinxes, of which only fragments remain. Between the end of the dromos and the main body of the building, 5 lofty pylones and 4 spacious courts intervene. In the first court were two obelisks of Thothmes I., one of which still remains; in the second court is another obelisk, the loftiest known except that of St. John Lateran at Rome; and in one of the chambers are the sculptures which compose the Karnak tablet, one of the most important records of Egyptian chronology. The dimensions of the great hall are 80 feet in height, 329 in length, and 179 in breadth; the roof is supported by a central avenue of 12 massive columns, 66 feet high and 12 feet in diameter, together with 122 columns of less gigantic dimensions. These vast courts, halls, and esplanades were reared by kings of the 18th and succeeding dynasties for purposes partly religious and partly secular. The sacred calendar abounded in days for periodical meetings; the troops were reviewed and the apportionment of the spoils of victory made in the courts of royal palaces, which also served occasionally for the administration of justice and for the encampment of the army. The ruins of Thebes hold a foremost place in the researches and speculations of Egyptologists.

THEBES (in the classical writers *Thebæ;* modern Gr. *Theva*), in Greek antiquity, the chief city of Bœotia, built on and around a hill between the streams of Ismenus on the east and Dirce on the west. The citadel occupied the height, and the greater part of the town stood in the valleys. Of its ancient buildings, monuments, and walls, there remain only a few scattered fragments, and its topography is entirely uncertain. It is impossible to harmonize the ancient writers as to the position or even the names of its 7 gates. Thebes was equally illustrious in the mythical and the historical ages of Greece. It was the birthplace of the divinities Bacchus and Hercules, of the seer Tiresias, the musician Amphion, the poet Pindar, and the warriors Pelopidas and Epaminondas; its two sieges and the fortunes of its royal houses were favorite subjects of tragedy; and it was for a time the ruling city of Greece. Tradition ascribed to Cadmus the foundation of the citadel, which was hence called Cadmea. From the 5 Sparti, the survivors of the progeny of the dragon's teeth, were descended the noblest Theban families. The expulsion of Œdipus, and the successive sieges by the "Seven against Thebes" and by the Epigoni, were the principal events before the Cadmeans were driven out by the Bœotians, a tribe from Thessaly. This occurred about 60 years after the Trojan war, according to Thucydides. The legislation of Philolaus, in the 8th century B. C., gave it an oligarchical instead of monarchical form of government, and made it the head of the confederacy of Bœotian towns. The first entirely certain event in its history is the revolt of one of these towns, Platæa (519 or 510 B. C.), which applied to Athens for protection. A war ensued between the Thebans and Athenians, in which the latter were successful, and which initiated lasting enmity between the two states. Thebes lost credit by abandoning the cause of Greece in the Persian war, and fighting against the Athenians at Platæa (479). The victorious Greeks appeared before its walls, and compelled the inhabitants to put their "Medizing" leaders to death. An Athenian invasion supplanted its oligarchy by a democratic government in 456, but the former was restored in 447. During the Peloponnesian war the Thebans were more anti-Athenian than even the Spartans, but joined the coalition against the latter in 395, and were the only portion of the allied army which was not routed by them at Coronea. The peace of Antalcidas, negotiated by Sparta (387), deprived them of their supremacy over the other Bœotian towns, and in 382 a blow was struck at their independence by the treacherous seizure of their citadel. They continued in the hands of the Spartan party for 3 years, when Pelopidas and others succeeded in expelling the garrison. In the hostilities which followed they recovered Bœotia, invaded Phocis, and triumphed over the Spartans at Tegyra (375). The decisive victory of Leuctra (371) gave to them the hegemony of Greece, and Epaminondas invaded Peloponnesus, and established there the Arcadian confederation and the state of Messenia as political powers antagonistic to Sparta. But they in vain sought to establish their supremacy by a general treaty, and lost it after the death of Epaminondas at Mantinea (362). Athens, long jealous of Thebes, was now able to resist it, and succeeded in wresting Eubœa from it (358). Thebes was soon after supported by Philip of Macedon against both Athens and Sparta in the Phocian war, and continued in alliance with him till he seized Elatea (339), when the eloquence of Demosthenes induced the Thebans to unite with the Athenians against his dangerous projects. They sent an army to the battle of Chæronea (338), in which their sacred band was cut to pieces in the ranks, and after which they opened their gates to a Macedonian garrison. The leading citizens were put to death or banished, but the exiles returned after Philip's death, besieged the garrison, and invited the other Greek states to declare their independence. The rapid advance of Alexander defeated their attempt (335). The city was razed to the ground, the temples and the house of Pindar alone being spared; the citadel was again held by a Macedonian garrison; the territory was divided among the allies; and the inhabitants were sold into slavery. Thebes was without inhabitants for the next 20 years, and, though restored by Cassander, never became again an independent state. In the time of Strabo it had dwindled down to the condition of a village, in which it has since remained.

THEFT. See Larceny.

THEINE. See Caffeine, and Tea.

THEINER, Augustin, a German theologian and priest of the Oratory, born in Breslau, April 11, 1804. He studied at the universities of Breslau and Halle, at first theology and afterward philosophy and law. While studying he fully shared the views of his brother, Johann Anton, on church reform, and assisted him in the publication of his extensive work on celibacy. An essay on the papal decretals procured for him from the university of Halle the degree of doctor of laws, and from the Prussian government a stipend for a scientific journey to Vienna, London, and Paris. A residence in a college of the Jesuits at Rome completely changed his theological views, and he became from an extreme Gallican one of the most uncompromising advocates of the papal prerogatives. He has ever since remained in Rome, where he was appointed in 1855 prefect of the secret archives of the Vatican. His writings, mostly on church history and church law, are very numerous, and many of them contain valuable documents, which he was for the first time permitted to publish from the papal archives. Among the more important of his works are a "History of Theological Seminaries" (Mentz, 1835); a "History of the Efforts of the Holy See to cause a Return of the Nations of Northern Europe to the Roman Church" (vol. i., Augsburg, 1837); a "History of the Return of the Houses of Brunswick and Saxony to the Roman Catholic Church" (Einsiedeln, 1843), &c. Against Crétineau-Joly, who had censured Clement XIV. for having suppressed the order of the Jesuits, he wrote, in vindication of the pope, the "History of the Pontificate of Clement XIV." (2 vols., Leipsic, 1853). He undertook to continue the church history of Baronius, and published the first 3 volumes at Rome in 1858. A collection of important documents relating to the church history of Hungary, mostly taken from the Vatican archives, was published by him in 1859 (2 vols.); and similar collections respecting Poland and Lithuania (2 vols.) in 1860 and 1861, and respecting the church history of France from 1790 to 1800, in 1858 (2 vols., Paris).—**Johann Anton**, a German theologian, elder brother of the preceding, born in Breslau, Dec. 15, 1799, died there, May 15, 1860. He studied Roman Catholic theology at the university of his native town, and was appointed there in 1824 professor of exegetical theology and of canonical law. He showed himself from the beginning a zealous advocate of Gallican principles, and took an eager part in movements among the clergy of Silesia for their practical introduction. Assisted by his brother Augustin, he published in 1826 an extensive work on the history of celibacy (*Die Einführung der erzwungenen Ehelosigkeit*, Altenburg, 1828; new ed., 1845), which at the time of its publication made a deep sensation in Germany, and is regarded as the most complete work on the subject. He resigned his chair in 1830, and held a pastoral charge until 1845, when he joined the German Catholics, publishing in vindication of this step *Die reformatorischen Bestrebungen in der katholischen Kirche* (Altenburg, 1845). But he soon disconnected himself from the movement, as its principal leaders, in his opinion, went too far, and joined the Protestant church. He afterward received an appointment in the library of the university of Breslau. Beside the works already mentioned, he wrote a commentary on the minor prophets, forming part of the Bible work of Dereser, and *Das Seligkeits Dogma der katholischen Kirche* (Breslau, 1847).

THEISS (anc. *Tibiscus;* Hun. *Tisza*), a river of Europe, which drains all eastern Hungary and the greater part of Transylvania. It is formed by the union of the Black and White Theiss about 20 m. E. N. E. from Szigeth, in the county of Mármaros, flows first westward to Tokay, thence S. W. to Szolnok, when it turns S. and enters the Danube near Titel, in the Military Frontier land, 22 m. E. S. E. from Peterwardein. Its length is about 500 m., for most of which it is navigable. Its principal tributaries are the Szamos, the Bodrog, Zagyva, Körös, Maros, and Bega. The chief commerce of the river consists in the conveyance of salt, timber, and agricultural produce.

THELWALL, John, an English author and elocutionist, born in London, July 27, 1764, died in Bath, Feb. 17, 1834. He was originally intended for an artist, but subsequently studied law, which however he abandoned in his 22d year for the profession of literature. In 1787 he published poems in 2 volumes, which brought him into notice; and embracing liberal opinions, he became a member of the "Corresponding Society." Taking a prominent part in the political agitation of the times, he was prosecuted for high treason along with John Horne Tooke and Thomas Hardy, and after a trial of 5 days was acquitted. He afterward lectured for a number of years on political subjects, and in 1801 began to act as tutor of elocution, upon which he contributed several papers to the "Medical and Physical Journal" and to the "Monthly Magazine." He also published "Poems written in the Tower and in the Newgate;" "The Tribune" (3 vols.); "Political Miscellanies;" "A Letter to Mr. Cline on Stammering;" "The Peripatetic" (3 vols.); and a novel called "The Daughter of Adoption."

THEMIS, in the Greek mythology, a daughter of Uranus and Gæa, married to Zeus. She dwelt in Olympus, and convened the assembly of the gods. She is represented in Homer as the personification of the order of things established by law, custom, and equity. At Thebes she had a sanctuary in common with Zeus Agoræus, and at Olympia in common with the Horæ, her daughters. Temples were also dedicated to her at Athens, at Tanagra, and at Trœzene.

THEMISTOCLES, an Athenian statesman and general, born about 514 B. C., died in Magnesia, Asia Minor, about 449. He was in early life so remarkable for his ambitious character that his master said to him: "My boy, you will not be any thing little, but certainly something great, good or bad." He was present at the battle of Marathon in 490 B. C., and may have been general of his tribe on that occasion. After the disgrace of Miltiades, Aristides and Themistocles became the chief men of Athens, and the rivalry between the two was so bitter that the former is reported to have remarked: "If the Athenians were wise, they would cast both of us into the *barathrum*." The contention, after being carried on 3 or 4 years, resulted in 483 in an appeal to a vote of ostracism, and Aristides went into exile. From this time Themistocles was the great political leader in Athens, and his active genius saw at once the steps necessary to be taken to save the city from the threatened revenge of the Persian king, who had been making vast preparations for the conquest of Greece. He persuaded the Athenians to build 200 ships with the produce of the silver mines of Laurium, instead of distributing it among the citizens; and he endeavored in various ways to make Athens a great naval power. The open bay of Phalerum was given up as a harbor, and the new harbor of Piræus was begun to be formed and fortified during the year when he was either archon or general. In the beginning of 480, as the force of Xerxes was on the point of passing the Hellespont, 10,000 heavy-armed Greeks, under the command of the Spartan Euænetus and Themistocles, occupied the defile of Tempe; but finding that troops could be landed in their rear, and that there was another entrance into Thessaly through Macedonia, they retreated to their ships. All northern Greece was in consequence left defenceless, and either joined or submitted to the invaders. Themistocles now commanded the Athenian portion of the fleet which was stationed at Artemisium, under the Spartan Eurybiades. When the vast number of Persian ships was discovered, Eurybiades was disposed to draw back to southern Greece; but the Eubœans gave 30 talents to Themistocles, with which he induced the Spartan commander, and also the Corinthian Adimantus, to remain and defend Eubœa. In the ensuing battle, fought on the same days with the engagement at Thermopylæ, the Greeks had the advantage; but that pass having fallen into the hands of the enemy, and the Athenian ships being much crippled, it was determined to retire. Themistocles first, however, caused to be cut on the rocks at various points an address to the Ionians in the Persian fleet, entreating them either to desert or to fight backwardly against men of their own race. Athens, at the instance of Themistocles, was abandoned by its inhabitants, and its defence, in accordance with a Delphic response probably dictated by him, intrusted to the "wooden walls" of the fleet; and the whole naval force of Greece was gathered together at Salamis under Eurybiades. Of the 378 ships, beside penteconters, comprising the fleet, the Athenians furnished 180. It was in consequence of the threat of Themistocles that the Athenian contingent would sail away to Siris in Italy, that it was determined to give battle; and when a fresh council had resolved to sail to the Peloponnesus, he frustrated their plan by sending a slave to the Persian commander with a message that the Greeks were meditating a flight, and could easily be cut off. The Persian fleet was consequently moved down in the night so as to enclose the Greeks, and there was no choice left for the latter but to fight. (See GREECE, vol. viii. p. 443.) After the great victory there gained, Themistocles and the Athenians were desirous of pushing on to the Hellespont and destroying the bridge of boats in order to prevent the retreat of Xerxes; but to this the other confederates refused to agree, and the plan was abandoned. Themistocles, however, according to the testimony of Herodotus, privately sent word to the king that he had restrained the Greeks from pursuing his ships and breaking up his bridges over the Hellespont; and this he did in order to induce Xerxes to return, and that he might have a safe retreat in case any mischance should in the future befall him at Athens. He now employed his fleet in levying contributions from the Greek islands which had adhered to the Persians, and by this means gained considerable money for himself, without the knowledge of the other generals. After the division of the booty gained at Salamis, the Greeks sailed to the isthmus, where he was deprived of the first prize for skill and wisdom by each of the commanders voting for himself, but had a large majority of votes for the second prize. The envy of the leaders prevented any decision being made, but Themistocles was regarded as the wisest man in Greece, and the whole country was filled with his fame. He went to Sparta, and was there received with unprecedented honors; and though the Lacedæmonians gave to Eurybiades the crown of valor, they gave to Themistocles the crown of wisdom. When the Athenians returned to rebuild their ruined city, and to reconstruct their fortifications on an enlarged scale, Sparta from jealousy, but under a friendly guise, opposed and might have thwarted the project of refortifying; but Themistocles was sent there as ambassador, and contrived to deceive the Spartans until the walls were far enough advanced to be in a state of defence. Athens was now secure against external enemies, and Themistocles was more than ever desirous of making her a great maritime power. The work on the Piræus was resumed on a far grander scale, and the plan of the fortifications was such as to render them impregnable. To this costly and difficult work he encouraged the people by telling them that the Piræus was of more value to them than Athens itself, and that in case their city was taken they might retire behind these walls and on the sea defend themselves against the maritime power of the world. He also persuaded the Athenians to build every year 20 new triremes. The story told by Plutarch of his project for burning all the Grecian ships except the Athenian, so that no city but Athens might have a naval force, which was defeated by the justice of Aristides, is unquestionably a pure fabrication. After the fortification of the Piræus his political ascendency declined, in consequence of his duplicity, his unprincipled love of money, and especially his acts in regard to the insular allies. His opponents in Athens were headed by Cimon the son of Miltiades, and by Alcmæon. He was tried and acquitted on a charge of treasonable intercourse with the Persians, but about 471 was ostracized and went into exile to Argos. While he was there the treason of Pausanias was discovered, and among his letters were found proofs of the privity of Themistocles. The Lacedæmonians sent to Athens to prefer against him a charge of treason, and joint envoys from Athens and Sparta were despatched to Argos to arrest him. Having notice of their coming he fled, and after twice narrowly escaping capture reached Susa, where he addressed to Artaxerxes, the son of Xerxes, a letter claiming protection on the score of his services to his father after the battle of Salamis, and asking permission to wait a year and then to come before him in person to explain his views. His request was granted, and he himself treated with honor. At the end of a year, having mastered the Persian language, he entered into personal communication with the king; and no Greek, says Thucydides, had ever before attained such a commanding influence and position at the Persian court. He excited Artaxerxes with plans for the subjugation of Greece, and was presented by him with a Persian wife and with large presents. After visiting various parts of Asia, he lived at Magnesia on the Mæander, and received his maintenance from the revenues of that and two neighboring cities. Some of his property at Athens was secretly sent him by his friends, but the bulk of it, amounting to 80 or 100 talents, was confiscated. He is said to have poisoned himself because he knew his promises to the Persian king could not be fulfilled. "Themistocles," says Thucydides, "was the strongest example of the power of natural talent, and in this respect is particularly worthy of admiration; for by his natural understanding, without any education originally to form it, or afterward to strengthen it, he had the best judgment in actual circumstances, and he formed his judgment with the least deliberation; and as to future events, he made in general the best conjectures; whatever he took in hand, he was also able to expound; and on matters where he had no experience, he was not unable to form a competent judgment; and both of the better and the worse, while it was still in uncertainty, he had a most excellent foresight; and to express all in brief, by the force of his natural capacity and the quickness of his determination, he was the most efficient of all men in promptly deciding what was to be done." His life was written by Nepos and by Plutarch.

THÉNARD, Louis Jacques, baron, a French chemist, born at La Louptière, Aube, May 4, 1777, died in Paris, June 21, 1857. The son of a poor farmer, he early repaired to Paris, and applied himself to chemistry under Fourcroy with such success as to be appointed, when scarcely 20 years old, assistant professor of that science in the polytechnic school, and afterward became professor there, at the college of France, and at the Sorbonne. He succeeded Fourcroy as member of the academy of sciences in 1810, and subsequently became a member of nearly all the learned societies of Europe. His clearness of exposition and elegance of style, enhanced by scientific fervor, made his lectures very popular. (See Chemistry, vol. v. p. 41.) Charles X. on his accession to the throne made him a baron, and in 1827 he was elected to the chamber of deputies. Under Louis Philippe he became a member of the council of public instruction, was created a peer in 1833, grand officer of the legion of honor in 1842, and soon afterward chancellor of the university. He was for many years president of the society for the encouragement of national industry; and near the close of his life he founded a "Society for the Succor of Friends of Science," for the benefit of inventors impoverished by useful researches, and contributed 20,000 francs to its funds. His most popular work, *Traité élémentaire de chimie théorique et pratique* (4 vols. 8vo., 1813–'16; 7th ed., 5 vols., 1836), has been translated into several European languages. He was a constant contributor to the *Annales de chimie*, *Annales de physique et de chimie*, and the *Mémoires* of the society of Arcueil and the academy of sciences.

THEOBALD, Lewis, an English author, born in Sittingbourne, Kent, died in Sept. 1774. He was the son of an attorney, and was bred to his father's business, but early abandoned it for literature. His first production was a now forgotten tragedy called "Electra," which appeared in 1714; and in 1717 he contributed to Mist's "Weekly Journal" a number of papers under the title of "The Censor," and by his criticisms provoked attacks from other writers, one of whom was Dennis. He is now remembered chiefly for having been the original hero of the "Dunciad," though in the later editions he was displaced to make way for Cibber. This position he owed to having pointed out the errors in Pope's edition of Shakespeare in a pamphlet entitled "Shakespeare Restored; or, a Specimen of the many Errors as well committed as unamended by Mr. Pope in his Edition of this Poet, designed not only to correct the said Edition, but to restore the true Reading of Shakespeare in all the Editions ever yet published" (4to., London, 1726). For the attack upon him in the "Dunciad" he brought out an edition of Shakespeare's works (7 vols. 8vo., London, 1733), which entirely destroyed the reputation of Pope's edition. Theobald wrote or translated 20 plays, now all forgotten, and also brought on the stage a play entitled "The Double Falsehood, or the Distrest Lovers," the greater part of which he asserted was composed by Shakespeare. Dr. Farmer maintained that it was the work of Shirley, but modern critics generally agree that there is in it very little either of Shakespeare or Shirley, and very much of Theobald. He was also author of a life of Walter Raleigh, and at the time of his death was engaged upon an edition of Beaumont and Fletcher.

THEOCRITUS, a Greek pastoral poet, a native of Syracuse, who flourished about 270 B. C. He went to Alexandria, and secured the favor of Ptolemy Philadelphus, but returned to Syracuse during the reign of Hiero II. Nothing else is known of his life. He wrote in a mixed dialect in which the Doric predominated, and was the creator of pastoral poetry as a department of literature. There are extant 30 poems, called by the general name of "Idyls," which are attributed to him, although some are doubtless spurious. Beside these, 5 lines from a poem called "Berenice," and 22 epigrams in the Greek anthology, are ascribed to his pen. Theocritus has had several imitators, of whom the greatest was Virgil, numerous commentators, and innumerable editors. The first edition was published without name of place or date, but probably at Milan about 1493; the latest is that of J. Meineke (Berlin, 1856). The "Idyls" have been several times translated into English.

THEODOLITE (Gr. ϑεω, see, δηλος, manifest, and ιτυς, circumference), an instrument used in surveying for measuring angles, both horizontal and vertical. When this instrument was invented is uncertain, but an act of the general court of Massachusetts of 1735 gives to Roland Houghton, a merchant of Boston, exclusive privileges for 7 years, for making and selling an instrument for surveying land of his invention called the new theodolite, by which, as declared in the act, "land could be surveyed with greater ease and despatch than by any surveying instrument heretofore projected or made within this province." It came into use soon after, and took the place in important surveys of the quadrant and repeating circle. It consists of a circular plate of metal so attached upon the head of a tripod or other support as to be readily brought to a horizontal position by thumb screws, according to the indications of the attached levels. Its outer circumference is divided into degrees and parts of degrees. A vertical axis passing through its centre supports a second plate nearly touching the lower one, and easily moved in either direction upon its axis. On opposite sides of the upper disk a portion of the edge is chamfered away, and upon the bevelled surface, forming a continuous slope with that of the edge of the lower plate, are marked the divisions of the vernier scale by which the degrees may be read off to minutes. Very large theodolites have 3 verniers 120° apart, the average readings of which reduce the liability of error. The upper plate carries upright standards firmly fixed to it, upon which is supported a telescope directed across its horizontal axis, so that it may be turned up and down in a vertical plane. A graduated arc of which this axis is the centre passes below the telescope between the standards, and serves to measure the degree of elevation or depression of the telescope. A long spirit level attached to the telescope itself affords a further check upon the accuracy of the levelling when the telescope is taken out of the Y's that support it and reversed. The vernier for the vertical arc is attached to the compass box, which occupies a position directly over the centre of the upper plate. The instrument is furnished with screws by which the plates are clamped, and also tangent screws for giving slight motions in a horizontal or vertical direction. When the telescope is directed to any object, the readings of the verniers are taken; the lower plate is then clamped, and the telescope is turned with the upper plate to any other object, and the horizontal angle between the two is thus directly obtained, the telescope being elevated or depressed as may be necessary. The difference of elevation may at the same time be noticed upon the vertical arc if desired, or the angle which either point makes from the horizontal line. The instrument may thus be used for levelling or for determining heights by triangulation. The theodolite differs from the transit in the limited range of the telescope of the former upon its horizontal axis, while the transit can be turned completely over so as to sight in either direction. The latter is a much more convenient and exact method of prolonging a straight line than by turning the telescope of the theodolite half round or reversing it in its Y's. The transit is very generally used in the United States, especially by railroad surveyors, instead of a theodolite; and to distinguish it from the astronomical transit instrument it is sometimes called engineer's transit, or railroad transit. It is sometimes furnished with a vertical circle for measuring vertical angles, and may then be called a transit theodolite. Theodolites of large size have been employed upon important trigonometrical surveys. Ramsden's great theodolite, completed in 1787 and used upon the surveys for connecting the observatories of Greenwich and Paris, had a circle of 3 feet diameter; other instruments of the same size have been used by the British government in England, Ireland, and India. The principal theodolites used upon the United States coast survey are very perfect instruments constructed by Gambey of Paris, the largest with a circle of 30 inches diameter and others of 10 inches. (See COAST SURVEY, vol. v. p. 396.) Theodolites in ordinary use have circles 5 inches in diameter.—For full descriptions of the construction and use of theodolites, see Heather's "Treatise on Mathematical Instruments," in Weale's "Rudimentary Series," and "Gillespie's Treatise on Land Surveying" (New York). The report of the superintendent of the coast survey for the year 1856 contains full instructions, by assistant J. E. Hilgard, in the method of testing a repeating theodolite.

THEODORA. See JUSTINIAN.

THEODORET (THEODORETUS), a father of the Greek church, and one of the chief representatives of the theological school of Antioch, born at Antioch in 386 or 393, died in 457 or 458. He was the scion of a noble family, went after the death of his parents into a cloister, became in 420 bishop of Cyrrhus on the Euphrates in Syria, and reunited many members of the sects with the Catholic church. He declared against the Nestorians, and at the council of Chalcedon, in 451, subscribed the condemnatory decree against Nestorius. He was one of the best exegetical writers of the ancient school (see Richter, *De Theodoreto Epistolarum Paulinarum Interprete*, Leipsic, 1822), and beside wrote homilies, of which those on Divine Providence are especially valuable; a history of the Christian church from 324 to 429; an epitome of heretical fables, the lives of 30 hermits, and 180 letters. Collective editions of his works have been edited by Sirmond (4 vols., Paris, 1642), and by J. L. Schulze and Nösselt (10 vols., Halle, 1769-'74). A translation of his "Ecclesiastical History" was published in Bohn's "Ecclesiastical Library" (London, 1854).

THEODORIC (Ger. *Dietrich*), surnamed THE GREAT, king of the Ostrogoths, born in Pannonia in 455, died in 526. The son of Theodemir, one of the chiefs of the Ostrogoths settled on the banks of the Danube, he was when 8 years old sent as a hostage to the court of Constantinople, where he was carefully educated in all martial arts and exercises, but utterly neglected literary culture. He was restored to his father at the age of 18, and, after greatly distinguishing himself in war, succeeded him as sole king of the Ostrogoths in 475. The southern part of Pannonia and Dacia had previously been ceded to them by the emperor Zeno the Isaurian, of whom Theodoric was for some years a faithful ally; but the emperor breaking his promises, war broke out between them, and Theodoric ravaged the Byzantine territories till Zeno in 483 appeased him by conferring upon him large gifts and many honors, even naming him consul in 484. The war was however renewed in 487, and Theodoric marched upon Constantinople; and to get rid of him Zeno proposed to him the invasion of Italy, then ruled by the usurper Odoacer. He consequently in 488 marched toward the peninsula at the head of his whole people, amounting to about 200,000, with a large number of wagons conveying their most precious effects and their store of provisions. He first met in the Alpine passes and routed an army of Gepidæ and Sarmatians, then defeated Odoacer himself on the banks of the Sontius (Isonzo), Aug. 28, 489. After two other victories, one near Verona, the other on the banks of the Adda, he shut his opponent within the walls of Ravenna, and after a siege of more than 3 years received his capitulation in 493, apparently consenting to share the kingdom of Italy with him; but Theodoric soon after had his rival assassinated at a solemn banquet, and firmly established his power over the whole peninsula. He distributed one third of the lands to his soldiers in military tenures, but preserved as far as possible the administrative organization of the Roman empire. Under his fostering care Italy became prosperous again; agriculture and industry revived; literature and the fine arts flourished; internal improvements went on, and new monuments were erected. His foreign policy proved equally successful; through well devised alliances, he controlled nearly all the barbarians that had settled in western Europe. He checked the triumphant progress of Clovis after the victory of Vouillé in 507, protected the Visigoths, and secured for himself the possession of Provence. His latter years were embittered by religious troubles; the Arians, to which sect he belonged, being persecuted in the East, he retaliated against the Catholics of Italy; this brought on a conspiracy, in which the philosopher Boëthius, a great favorite with him, and the venerable Symmachus were apparently involved, and in a moment of passion he ordered them to be put to death. Their innocence being afterward demonstrated, remorse preyed upon his mind and hastened his death. He is the Dietrich of Bern of the *Nibelungen-Lied.*

THEODORUS, king of Abyssinia, born about 1820. He is the son of a petty official in the province of Kuara in West Abyssinia, and his real name is Kassai. In a school at Gondar he learned to read and write, and afterward entered the army of the governor of Dembea, and served in the campaigns against the Turks. The governor recommended Kassai to his master Ras Ali, who gave him his daughter in marriage, and an official station under his mother Waisoro Meunen, to whom the province of Dembea belonged. With her Kassai soon quarrelled, defeated her army, took her prisoner, and released her only on condition of surrendering Dembea. Ras Ali, unable to avenge his mother, made over the province to Buru Goshu, the governor of Gojam, who in 1850 forced Kassai to seek refuge in the mountains of his native Kuara. Here he collected a band of followers, and, in Nov. 1852, unexpectedly reëntered Dembea, killed Buru Goshu himself, and defeated his army near Lake Tzana. In 1853 he became involved in a war with his father-in-law, who called in to his aid Ubye, the powerful ruler of Tigré, but was defeated and obliged to fly to the Gallas. Before attacking Ubye, Kassai formed an alliance with the abuna or primate, Abba Salama, who agreed to come to Gondar on condition that the Roman Catholic priests were expelled. By the defeat of Ras Ali, Kassai had become prince of Amhara, and he summoned Ubye to pay tribute; and on the refusal of that ruler a war ensued, in which the lord of Tigré lost his kingdom and his liberty. Kassai now assumed the title of king of the kings of Ethiopia, and the name of Theodorus, doubtless in reference to the old tradition that a king of the name of Theodorus should arise, who would make Abyssinia great and prosperous, and destroy the two chief Mohammedan cities in Arabia, Mecca and Medina. He now set about the task of civilizing the people. The Coptic was declared the national church, the Catholic priests being driven away, although the Protestant missionaries were suffered to remain. Edicts were issued forbidding the slave trade, polygamy, the emasculation of enemies, and the mutilation of adult captives. Trade and agriculture have been specially favored, and all custom houses from Gondar to Halai have been abolished. In 1855 he issued an order to the Mohammedans to become Christians within two years or to leave the country; and the Galla tribes whose land he has conquered have assumed the Christian faith. In 1856 he subdued Shoa in southern Abyssinia, but the Mohammedan element, which is strong in that region, is not entirely suppressed. John Bell, an Englishman, is his adjutant and engineer, and an English consul resides at his court. The missionary Krapf, who visited him in 1855, says that at that time he not only conducted all his wars in person, but was also personally the dispenser of justice, was quick in judgment, and friendly to Europeans.

THEODOSIUS, a Roman general, beheaded in Carthage, A. D. 376. During the reign of Valentinian he was sent to the defence of Britain, in 367 crossed the channel at the head of a large army, and in two campaigns freed the country from the barbarians, strengthened the fortifications, and confirmed the Roman power. In 370 he returned, was made master-general of the cavalry, and was stationed on the upper Danube, where he defeated the Alemanni. When in 372 Firmus, a Moor, had made himself master of Mauritania and Numidia, and Count Romanus, the governor of Africa, unable to oppose, had joined him in rebellion, Theodosius was sent to that country to reduce it to its allegiance. Firmus at first attempted to deceive him by an appearance of submission, but all his arts were rendered unavailing by the prudence and perseverance of Theodosius. At the head of a small body of men, he advanced into the heart of an unknown and hostile country, driving his enemy before him, until at last the usurper fled to Igmazen, king of the Isaflenses. The latter being threatened with destruction for harboring him, Firmus strangled himself, and his dead body was given up by Igmazen. Theodosius recovered Africa, but on the suspicion that his name and services were too great for a subject, he was put to death. From him descended a line of Roman emperors.

THEODOSIUS I., the Great, a Roman emperor, son of the preceding, born in Italica or Cauca, Spain, about A. D. 346, died Jan. 17, 395, He learned the art of war under his father, was early given a separate command and appointed duke of Mœsia, and while occupying that station gained in 374 a victory over the Sarmatians. After the execution of his father he retired to Spain, where he led a private life, cultivating and improving his land. In 378 the emperor Valens was killed and the Roman army terribly defeated by the Goths on the plains of Adrianople; and the surviving emperor, Gratian, summoned Theodosius from his retirement to take the supreme command, declared him Augustus, Jan. 19, 379, and assigned to him the administration of Thrace, Asia, and Egypt, with Dacia and Macedonia. Fixing his head-quarters at Thessalonica, Theodosius carried on the war against the Goths during 4 campaigns (379–382), hazarding no general engagement, but reviving the dispirited Roman troops by attacking the enemy in detail. After the death of Fritigern, the Gothic leader, that nation was broken up by dissensions and jealousies; and Modar, a prince of the Amali, was won over to the Roman cause, and surprised and slaughtered a large body of his countrymen. The Goths were afterward again united under Athanaric, who made peace and visited Constantinople, where he died; and the magnificent funeral honors paid him by Theodosius so won over his followers that they enlisted in the Roman army. In 383 Gratian, the emperor of the West, was dethroned and put to death by Maximus, who sent envoys to Theodosius excusing his conduct and offering him peace or war. Theodosius was not in a condition to accept the latter, and he reluctantly entered into a treaty with the usurper, by which he recognized him as emperor of the countries north of the Alps, Valentinian, the brother of Gratian, being secured the possession of Italy, Africa, and western Illyricum. Theodosius now devoted his attention to the affairs of the church. Although born of Christian parents, he was not baptized until the first year of his reign, when he confessed the orthodox faith. Returning to Constantinople, the stronghold of Arianism, he determined to do away with that creed, and gave to the archbishop Demophilus the alternative of subscribing to the Nicene creed or instantly resigning. Demophilus chose the latter, and Gregory Nazianzen was installed in his place. Six weeks afterward Theodosius commissioned his lieutenant Sapor to expel all the Arian clergy from the churches in his dominions, and gave him a military force sufficient to carry out the decree. In May, 381, he assembled the first council of Constantinople, to confirm and complete the Nicene creed; and during 15 years he issued at least 15 edicts against all heretics, especially against those disbelieving the doctrine of the Trinity. In the mean time Maximus, having collected an army of barbarians, entered and conquered Italy, which Valentinian had deserted on his approach, fleeing to Thessalonica. The disposition of Theodosius to undertake the cause of the fugitive emperor was seconded by the tears of Galla, the beautiful sister of the latter, whose marriage with the emperor of the East was the pledge of civil war. His army and navy were quickly assembled, and at the head of a large body of disciplined men he marched against Maximus, encamped at the Pannonian city of Siscia on the Savus, who was defeated and fled to Aquileia; but the gates of the city had scarcely been shut before Theodosius appeared, and Maximus was given up by his own troops and put to death. The emperor of the East, after restoring peace to the provinces, entered Rome in triumph, June 13, 389. At this time the citizens of Antioch, burdened by the expenses of the war, rose in a fury which discharged itself on the images of the imperial family, which were torn down and dragged through the streets. The disturbance was quickly suppressed; but a sentence of terrible punishment was pronounced against the city by Theodosius, who however was finally induced to suspend its complete execution. The people of Thessalonica having for a slight cause murdered Botheric and the principal officers of the little garrison, the emperor sent thither an army of barbarians, who, when the inhabitants were assembled by invitation at the circus, massacred them to the number of many thousands. For his crime in sending the order for this deed, Theodosius was forced by the undaunted Ambrose, archbishop of Milan, to do public penance. The emperor spent 3 years in Italy, and seated Valentinian on the throne of that country. The latter did not long enjoy his elevation, being strangled in 392 by his general Arbogastes, who had secured for himself all the real power of the government, and who now set up as emperor the rhetorician Eugenius. Theodosius undertook again the conquest of the West. He crossed the Julian Alps, and, after a severe and long uncertain contest, defeated Arbogastes in the open country extending from their foot to the walls of Aquileia. He was now master of the whole Roman world. Honorius, his younger son, was called to Milan to receive the sceptre of the West, and here Theodosius died immediately after his arrival. In the eastern empire he was succeeded by his elder son Arcadius. Theodosius, though naturally of a mild temperament, was much influenced by his passions, and many of the measures of his reign were marked by extreme cruelty. His great panegyrist is the poet Claudian. His reign is especially remarkable for the formal destruction of paganism, and for his efforts in this respect his fame is placed by the ecclesiastical writers of the time on a level with that of Constantine.

THEOGNIS, a Greek elegiac poet, who flourished about 548 B. C. He was a citizen of Megara, in Greece; and as in the contests between the aristocratic and democratic parties in that little commonwealth he belonged to the former, he shared in their defeat. He went into exile to Thebes, and during his life visited Sicily, Eubœa, and Sparta. He survived the Persian war of 490 B. C. The fragments attributed to him form the largest collection of gnomic poetry now extant. There have been numerous editions of them, one of the best being that of F. Th. Welcker (8vo., Frankfort-on-the-Main, 1826).

THEOLOGY (Gr. Θεος, God, and λογος, discourse), the doctrine of the Divinity and of divine things. The name *theologos* was given by the Greeks to the authors of theogonies (as Orpheus and Hesiod), and to those who wrote poems (as Empedocles) or philosophical treatises (as Pherecydes) on divine things and the origin of things through the gods. A distinction was early made, as by Varro, between "mythical theology," a knowledge of the myths and legends concerning the deities in the classic poets; "physical theology," the investigations of philosophers on the origin of the world; and "civil theology," a knowledge of public worship. In the New Testament the word theology does not occur. The ecclesiastical writers of the 3d and 4th centuries used the word, but applied it only to a part of the doctrines of Christianity, especially to the doctrine of the Trinity, or to the doctrines of the divinity of the Son or the Spirit. Somewhat later the name was used by Theodoret, Maximus, and others, of the aggregate doctrines of the Bible, but its most common signification remained the doctrine of God. Abelard was the first to apply the term to the entire science of the Christian religion, which signification it has since retained. With regard to the sources from which theology derives its contents, it is common to divide it into natural or philosophical theology, which confines itself to the development of the religious ideas resting on rational arguments only, and into positive or revealed theology, which sets forth and systematizes the doctrines of the Scriptures and of the church. A part of revealed theology is biblical theology, which is occupied solely with the investigation and representation of the doctrines contained in the Bible. With regard to the contents of theology, a distinction is made between theoretical theology or dogmatics and practical theology or ethics. Theology, viewed as the whole of religious science, is commonly regarded as consisting of four main branches, historical, exegetical, systematic, and practical theology. These are again variously subdivided, and have several auxiliary sciences connected with them. Thus historical theology embraces the history of the church, of Christian doctrines, of heresies, of councils, &c. To exegetical theology belong the interpretation (exegesis) of the Bible; hermeneutics, the science which teaches the right principles to be observed in interpreting the Bible; criticism, which examines and tries to establish the genuine original text; the introduction to the Bible, which discusses the time when and place where every book of the Bible originated, its authenticity, and kindred questions. Systematic theology, also called merely theology, comprises the system of Christian doctrines (dogmatics); the system of Christian ethics; symbolics, the comparative statement of the doctrines of several religious denominations, &c. Practical theology includes homiletics, catechetics, liturgics, ecclesiastical law, &c. Polemics and apologetics, which are also often treated as separate branches of theology, belong to several of the above four principal divisions at the same time.—Until the time of Abelard little attention was paid to comprehending theology in its totality, and to establishing the connection of the branches with each other. After him steady progress was made in systematizing theology. Although nearly all the theologians of the middle ages whose writings are extant belonged to the same church, yet they were divided into two fundamentally different schools, the scholastics and mystics. The theologians of the churches which grew out of the reformation of the 16th century followed, in their treatment of theology, either the scholastics or mystics, though the name of the former was discarded both by their Protestant and Roman Catholic followers. A new era in the history of theology was established by the philosophy of Kant, who fully developed and systematized a new theory of Christian theology, commonly called rationalism, which more or less made the belief in a religious doctrine dependent on its demonstrability by reason. This view gained the ascendency in several Protestant churches, and for a time numerous adherents in many others. Its opponents, who defended the Bible as the absolute rule of faith, were called supranaturalists, and the subsequent history of theology is a contest not yet ended between these two systems. The main arena of this controversy has been Germany, where through Schleiermacher, through the philosophy of the absolute, through Strauss and others, a number of new schools arose in succession, which deeply agitated the entire Christian world. (See German Theology.) It has also been attempted to build up theological systems in opposition to Christianity, such as deism and pantheism.—Valuable systematic works, giving a survey of the entire field of Christian theology, have been published by President Dwight, Dr. J. Pye Smith, Professor Hodge, and others, and useful encyclopædic manuals by Hagenbach, Pelt, and Standenmaier.

THEOPHRASTUS, a Greek philosopher and author, born at Eresus, in the island of Lesbos, died in 285 B. C., according to some at the age of 85, and according to others of 105 years. He studied at Athens under Plato and Aristotle; and when the latter withdrew from the lyceum, Theophrastus became his successor. The number of his pupils from all parts of Greece was at one time 2,000. His popularity and influence on the public affairs of Greece excited a party spirit against him, and being brought before the Areopagus on a charge of impiety, he pleaded his own cause, and was acquitted. After this he taught in tranquillity until 305, when Sophocles, son of Amphiclides, carried a law which prohibited all philosophers, under pain of death, from giving any public instruction without the permission of the state. Theophrastus left Athens; but in the next year the law was abolished, and he returned, and continued his labors without interruption until his death. He developed no new system of philosophy, but expounded that of his master Aristotle. He wrote works on politics, laws, legislators, and oratory, which are lost, and "A Dissertation on the Senses and the Imagination," a work on "Metaphysics," "Characters," and two works on botany, "The History of Plants" and "The Causes of Plants," which are extant in whole or in part. The two last are among the earliest works on botany written with any scientific precision, and contain much valuable matter. The book of "Characters" consists of 30 sketches of the general vices of humanity as developed in individuals. All the remains of Theophrastus are contained in the edition of Aristotle printed by Aldus (5 vols. fol., Venice, 1495-'8); the best edition of his works is that of J. G. Schneider (5 vols., Leipsic, 1818-'21). His "Characters" were translated into French and prefixed to his own by La Bruyère, and into English, among others, by Francis Howell, with notes and illustrations and the original text (8vo., London, 1824).

THERA (now *Santorin*), a Grecian island of the Ægean sea, now belonging to the government of the Cyclades, in the kingdom of Greece, in lat. 36° 20' 45" N., long. 25° 32' 58" E.; length about 9 m. from N. to S., breadth about 3½ m.; pop. in 1852, 21,827. It is crescent-shaped, with the concavity on the W. side forming a bay or roadstead partially protected by the small islands of Therasia and Aspronisi. As no bottom is found, vessels make fast to the abrupt and rocky shores in this roadstead. The soil of the island is volcanic and inclined to dryness, but very fertile. The annual production of wine is over 1,000,000 gallons. Ship building is the only considerable manufacture carried on. Though an ancient Lacedæmonian colony, Thera is only of historic importance as having sent a colony to found the city of Cyrene in Africa, 631 B. C. It possesses much interest to the physical geographer, however, from the volcanic changes which have occurred in it within the historic period. The concave W. side of the island has been proved to be a part of the inner wall of an immense volcanic crater, of which the two islands of Therasia and Aspronisi form a continuation. Soundings made by command of the English admiralty show that this crater is from 1,200 to 2,449 feet in depth, and that it forms a complete bowl except at the northern point between Therasia and Thera, where there is a perpendicular slit a mile in width and 1,170 feet deep midway between the two islands. In the centre of this bowl 4 different islands have risen during volcanic eruptions within the historic period, 3 of which still exist, and are called the Cammenis. The first, then called Hiera (Holy), now Palæa (Old) Cammeni, burst out of the sea with terrible flame and noise in 197 B. C. A second island, which has since disappeared, rose near the first in 67 B. C. A third appeared in A. D. 46, and is supposed to be that now known as Mikra Cammeni (Little Cammeni). Numerous other eruptions and changes occurred down to 1707, when another island, the Nea Cammeni (New Cammeni), was formed, at first composed of white pumice, but subsequently receiving additions of brown trachytic rock, to which the name of Black island was given. The eruption did not wholly cease or the island assume its present form till 1712, since which there has been no volcanic action.

THERAMENES, a native of Cos, who was a political leader at Athens toward the end of the 5th century B. C. In 411 he became a member of the council of 400; but seeing that the downfall of this government was near at hand, he deserted it and became one of the leading agents in its overthrow. In 410 he commanded a portion of the Athenian fleet, which was engaged in cruising about and exacting money from the islands, and finally joined the fleet under Thrasybulus, and took part in the battle of Cyzicus, in which he commanded one of the 3 divisions of the Athenian force. He also served with Alcibiades, and in 408 participated in the siege of Chalcedon and the capture of Byzantium. He was one of the inferior generals at the battle of Arginusæ in 406. In the trial of the generals for not saving the crews of the ships after the result of the battle was known, Theramenes came forward as the principal accuser of his colleagues, and it was chiefly owing to his influence that they were convicted and sentenced to death. After the battle of Ægospotami, and during the siege of Athens by the Spartan general Lysander, when the city was reduced to great extremity, Theramenes offered himself to the people as a suitable envoy to the Lacedæmonians, declaring that he could detect the real intention of the ephors in regard to Athens, and that also he had influence to obtain for them more favorable terms than any other. He was accordingly sent to inquire and report, but remained 3 months with Lysander, who he pretended detained him that length of time without informing him that the ephors only had power to grant peace; and upon his return to the city, which was now suffering under a terrible famine, he was sent to make peace on any terms. The hard conditions imposed by the Lacedæmonians were assented to (see GREECE, vol. viii. p. 448), and in 404 Theramenes, who had during his 3 months' stay with Lysander made arrangements with the Athenian oligarchical exiles, became one of the thirty tyrants. He warmly supported the first measures of the government in crushing the democracy and putting to death its prominent leaders; but he afterward opposed the violent measures of Critias and his colleagues, who had private hatreds to gratify. His party daily increased; but Critias, after charging him with being a public enemy, caused him to be dragged off to prison by partisans with concealed daggers whom he had brought into the senate house, and compelled him to instantly drink the hemlock. Theramenes was an able though faithless and cunning man; but the heroic manner in which he met his fate, and the fact of his dying in defence of the liberties which he had previously conspired to betray, rendered him a special object of admiration to the ancients.

THERESA, Maria. See Maria Theresa.

THERESA OF JESUS, Saint, a nun and mystic writer of Spain, born at Avila in Old Castile in 1515, died Oct. 4, 1582. At the age of 20 she entered the order of Carmelites in a convent of her native town, in which she remained 27 years. She then became the foundress of a reformed branch of the Carmelites (Barefooted Carmelites), sometimes called after her Theresians. During her life 29 convents of the reformed order were established, and in the 18th century it counted about 2,000 members in 6 provinces, in Spain and Spanish America. Theresa described the internal struggles and aspirations of her heart and her frequent mystic visions in ascetic treatises and letters, which, on account of their theological importance, belong among the most memorable documents of the mystic literature of the Roman Catholic church, while their excellence of language and style has secured for them a place in the history of Spanish literature. She wrote her works reluctantly, and only at the command of her confessor. The following five of them are extant: *Discurso o relacion de su vida*, written in 1562; *El camino de la perfeccion*, prepared in 1568, as a guide for the nuns of her reformed order; *El libro de las fundaciones*, an account of the convents founded by her; *El castillo interior, o las moradas*, written in 1577, and the most celebrated of her mystic works, in which she portrays in glowing colors the gradual progress of the soul to the 7th heaven, the celestial castle of Christ, her spouse; *Santos conceptos de amor de Dios*, the original of which she burned in compliance with an order of her confessor, but which has been preserved from a copy taken by one of the nuns. The original manuscripts of the first four works are preserved in the library of the Escurial by order of King Philip II. The first complete edition of these works appeared at Salamanca in 1587, and a recent one, edited by Ochoa, at Paris in 1847 (*Tesoro de las obras misticas de Santa Teresa de Jesus*). A collection of letters of St. Theresa, addressed to different persons, was first published at Saragossa in 1658, and often since. All her works have been translated into nearly every language of Europe, and still frequently appear in new editions.

THERMAIC GULF. See Salonica.

THERMO-ELECTRICITY (Gr. ϑερμη, heat, and ελεκτρον, amber). For the principles relating to electric currents, so called, and the methods of indicating and measuring them, see Electro-Dynamics, and Electro-Magnetism. Professor Seebeck, of Berlin, was the first to discover, in 1822, that if two metallic bars having different crystalline texture, or unequal conducting powers through any cause, are placed in contact or soldered together, end to end, and heated or cooled at the junction to a temperature different from that of the other parts, and if from the other ends of the bars, at the same time, conducting wires be arranged to complete a circuit, the natural electricity of the metals is disturbed, and an electrical current is set up, which is maintained so long as the parts are kept at an unlike temperature. When the bars are of bismuth and antimony, and the junction is heated, the positive current is at this from the antimony to the bismuth, and along the conducting wires from the latter to the former; upon cooling instead, the current is reversed; and when the temperature of the bars becomes equal throughout, the current ceases. An extremely feeble current, indeed, is obtained by unequally heating a single bar, as of bismuth. The currents obtained under either of these conditions are distinguished as thermo-electric; and experiments have determined a thermo-electric series of metals, of which the following is a part: bismuth, platinum, lead, tin, copper or silver, zinc, iron, antimony. These are here placed in such order that any one before gives with any one later in the series, by heat, a current through the conducting wires from the former to the latter. With a given difference of temperature, the current is more intense as the metals are further apart in the series, being the most intense yet known with bismuth and antimony; the current is constant so long as the difference of temperatures is so, as when the junction is kept at 212°, the further ends at 32°, or the reverse; and with given metals, it is more intense as the difference of the temperatures is greater. With any single pair of bars, it is still comparatively feeble; but when the metals of several pairs are alternately connected, and the temperatures of the alternate junctions kept equidistant, as is readily done by bending each bar at right angles at the ends, soldering, and arranging so as to bring any number of pairs into a square prismatic pile, having the length of a single bar, with non-conducting strips between the bars, and the terminal ones connected by conducting wires, the intensity of the current is then, as in the galvanic battery, precisely multiplied by the number of the pairs. Such an arrangement, devised by MM. Nobili and Melloni, is a thermo-electric pile; the ends of the bars in the opposite directions form the two "faces" of the pile; laterally this is enveloped in a sheath, protecting all but the faces; and in this sheath, communicating respectively with the free antimony and bismuth bars at the extremities of the pile, are two cups, termed the poles of the pile. The number of pairs may be 30 or more; and as the size of the bars does not influence the strength of the current, these may be very small, and if desirable no more than an inch in length. Now, when one of the faces is kept at a given temperature, and the other exposed to a source of heat or to cold, even though this be very feeble, yet the multiplying effect of the number of pairs produces a current strong enough to give a very sensible deflection to the needle of a galvanometer with which the poles are connected; and the instrument forms by far the most delicate means known for the detection of feeble degrees of heat, and thus determining the behavior of various substances in reference to radiation, transmission, &c., of this agent. In the complete apparatus, known as the "thermo-multiplier," there are screens for protecting at will either face of the pile; a lamp and reflector for emitting radiant heat; a stand to support the substances to be experimented upon; and a hollow metallic cone, polished within, for concentrating the rays of heat, when required, upon one face of the pile. In Melloni's pile of 30 pairs, the indications of the needle are strictly proportional to the temperature only to 20° of deflection; and beyond this corrections must be introduced. Deflection of 35° corresponds to unequal heating of the faces through 6°–8° temperature. For an example of the sensitiveness of the instrument, as well as for the most important results thus far attained by its use, see DIATHERMANCY.

THERMOMETER (Gr. ϑερμη, heat, and μετρον, measure), an instrument designed, by means of the visible or mechanical effect of heat upon some part or substance entering into its construction, to show, and sometimes also to register, the temperatures or sensible heats of the bodies or spaces to the influence of which it is exposed. For the general principles upon which the invention and use of the thermometer are based, see EXPANSION, and HEAT (I.); and for the difference between the actual and the apparent or sensible heat of bodies, with the modes of measuring the former, see CALORIMETER, and HEAT (III.).—The first attempt at indicating to the eye differences of temperature, seems to have been by the contrivance variously ascribed to Drebbel of Holland and Sanctorius of Italy, about the beginning of the 17th century, and known as a weather glass. This was very rude and inaccurate, consisting of a glass bulb and tube inverted, opening below into a cup of colored liquid, which, the air of the bulb having been partly expelled by heat, rose in the tube, and stood at different heights according as the air remaining in the bulb was more or less expanded by heat. This, the origin of the common air thermometer, as improved by Boyle and by the Florentine academicians, became transformed to a smaller bulb with upright stem of somewhat fine bore, the contained liquid being colored spirits of wine; boiling this to expel air, the tube was hermetically sealed, and the whole then affixed to a case. A scale of degrees was also introduced, its fixed points being the cold of snow or ice and the greatest heat known at Florence; it was of necessity very variable in its indications. At this stage in the progress of thermometry, much discussion in regard to the most suitable fixed points for the scale, the best substance for use in the instrument, &c., including that of the question whether water did not freeze at different temperatures in different latitudes, was carried on in England and on the continent. Hooke advocated as the lower fixed point the temperature of freezing water; but Newton seems first to have discovered or taken advantage of the facts, that a thermometer placed in melting snow or ice always indicates the same temperature, and always very nearly one temperature in boiling water. But of oil, which he suggested for the liquid in the bulb, the movements were found to be too sluggish and uncertain. Römer, overcoming a prejudice that seems to have existed in regard to unequal expansion of mercury, first adopted that liquid; and he doubtless devised the instrument and scale usually attributed to Fahrenheit of Amsterdam (1720); the latter constructing and introducing the instrument, so that it became generally known throughout Europe in the first half of the 18th century. Of this thermometer, the lower fixed point, or zero, was taken at 32° below freezing point of water; but whether as the cold obtained by its maker by mixing salt and snow, or as the greatest cold observed in Iceland, and in either case as the supposed point of absolute cold, is not now definitely known; and since Fahrenheit kept his graduation of thermometers a secret, the same must be said respecting the choice of a scale of 180° between the fixed points, though this is supposed to have originated in some theoretical views as to the dilatation of mercury. Celsius of Sweden (1742) introduced a scale of 100° between the fixed points; this was adopted in France at the time of the revolution, and named the *thermomètre centigrade;* and owing to its convenient decimal division, it has been wholly adopted in several countries of Europe, while it is coming into general use among scientific men throughout the world. An advantage of Fahrenheit's scale, in many instances, is still that the less range of the degree saves the necessity of so often resorting to fractions in the expression of temperatures; its real fault and opprobrium is its needlessly fixing the 0 elsewhere than at the freezing point; and perhaps, could its zero be restored to the true place, and the range from this to boiling point be divided into 160°, the utmost convenience and perfection of a thermometric scale would be attained. The scale of Réaumur is 80° between the fixed points; and that of De Lisle, now little used, is 150°, taking the zero at boiling point and reckoning downward.—Obviously, the expansive effect of heat upon any convenient solid, liquid, or gas, can be made the measure and indicator of temperatures; and for the purpose each of these three forms of matter is in use. For ordinary use, however, the simple expansion of a solid is too small, and that of a gas too great, and difficult to measure. Liquids have an intermediate range of expansion, and are hence more conveniently managed and observed; and of the different liquids which offer some features of convenience, mercury is readily determined to be the most eligible for general employment, by the nearly equal rate of expansion throughout the range between its solidifying and its subliming in vapor; by the great extent of that range, more than 700° F.; by the rapidity with which it acquires the temperature of the space it is in; by its slight tendency to adhere to the glass tube; and by the readiness with which it is freed of air. In making a mercurial thermometer, a glass tube with bore of capillary size, and this as nearly as may be of uniform capacity throughout, is selected; the approximate uniformity being readily tested by introducing a short column of mercury, impelling it by air through the tube, and observing whether it preserves nearly equal lengths throughout. Cutting the tube to the required length, a bulb is blown upon one end in the usual method of glass-blowing, but, to avoid moisture, with air from a rubber bag. The greater the capacity of the bulb, as compared with that of the tube, the greater the length of tube that will be filled by a given degree of expansion of the mercury, and so the greater the delicacy of the indications, *i. e.*, the power of showing slight changes of temperature. The bulb is more commonly made spherical, and this form best resists any effect of varying pressures of the atmosphere; but for sensibility in point of time, or quickness of response to the acting temperature, that affording, with a given quantity of mercury, the largest surface is best; and this quality, others being disregarded, is secured by the cylindrical bulb, which is usually straight, sometimes coiled. A small cup is now cemented to the open end of the tube, or a paper funnel introduced into it; into either some mercury is put; the bulb is heated with a lamp to expel air, and then left to cool, when the atmosphere forces in mercury, partly filling it. The lamp is applied again, and the mercury boiled some minutes to expel air and moisture; upon subsequent cooling, mercury from the cup or funnel alone enters, completely filling the bulb and tube. Emptying the cup, this is removed by heating with a blowpipe, at the same time drawing the upper end of the tube to a narrow neck; and then, by reheating the instrument to the highest temperature it is expected to show, the excess of mercury over just enough to fill the bulb and tube at such temperature is expelled; removing the lamp, as soon as the column begins to contract, the flame is directed upon the end of the tube, hermetically sealing it. In contracting upon cooling, the mercury withdraws mainly into the bulb, leaving much of the tube vacuous, save that it may contain an extremely rare mercurial vapor; and the instrument is now complete, except the graduation and mounting.—It will be evident that we know nothing of absolute temperature, except theoretically; that the range of actual and possible temperatures reaches beyond our powers of detection, both upward and downward, and to an indefinite extent, so as to be comparable to an endless chain of which we can discover only so many links at some part of its course; that any temperature we may choose for our fixed point must be simply arbitrary; and yet, that by selecting two such fixed points, dividing the intervening range into a fixed number of degrees, and extending this scale by equal intervals of sensible temperature both above and below the fixed points, we introduce a sufficient and accurate means of measuring and comparing the temperatures we can observe. The only peculiar fitness of the fixed points that have been selected, is in their being the most nearly invariable, and the most convenient in practice. In Fahrenheit's scale, the freezing point of water is called 32°, the boiling point 212°, the intervening range thus being divided into 180°; in the centigrade, the freezing point is 0°, the boiling point 100°; all temperatures above the 0, in either of these scales, being considered, and when needful marked, +, and all below 0, —. Though the rate of expansion of pure mercury increases slightly with the rise of temperature (see EXPANSION), yet both the amount and the variation are known; and by this amount, 1 part in 55.08 between the fixed points, the capacity of the tube between the heights of column in it showing the freezing and boiling points, will be precisely $\frac{1}{55.08}$ of the whole capacity of tube and bulb below freezing point. If, now, thermometer tubes of perfectly uniform bore could be had, and the expansion both of the mercury and the glass tube containing it could also be supposed uniform, then the rise of the column in such a thermometer would be through its whole range precisely proportional to the expansion, and precisely equal for the same number of degrees in any part of the scale. All these suppositions, however, fail in the fact. To find the freezing point, the bulb and the tube, to very nearly the height to which such cold will lower the column, are kept immersed in melting pounded ice or snow, long enough to bring the mercury and glass throughout to the freezing temperature; the contraction and relative volumes of both are thus rightly secured, and the point below which the mercury column ceases to fall is marked on the tube with a file. Water boils at temperatures varying not only with the atmospheric pressure, but also with the purity of the water itself, with the kind of vessel, and state of its surface; but the temperature of the steam or yet uncondensed vapor freely arising from it does not vary with these latter conditions, but in strict relation with the pressure merely. Hence, to find the boiling point, the instrument is next immersed, not in boiling water, but within the steam freely escaping from it (the best apparatus for the purpose being that of Regnault), and when the barometer shows a fixed atmospheric pressure of 29.92 inches of mercury. In this also the instrument remains until the glass and mercury have throughout acquired the temperature of the steam; then, their expansions being completed, and the column ceasing to vary, the height is marked as before. If the barometer indicates any other pressure than that above given, a correction must be made, and the true boiling point marked higher or lower than that shown at the time; the correction being by a space corresponding to 1° F. for every .59+ inch of the barometer. The different thermometric scales are readily reducible to each other; rules for the reductions most commonly required, representing any given number of Fahrenheit degrees by F°, of centigrade degrees by C°, &c., are thus briefly expressed: To reduce

Fahrenheit to Centigrade....... $\frac{5}{9}\,(F° - 32) = C°$.
Centigrade to Fahrenheit....... $\frac{9}{5}\,C° + 32 = F°$.
Fahrenheit to Réaumur......... $\frac{4}{9}\,(F° - 32) = R°$.
Réaumur to Fahrenheit......... $\frac{9}{4}\,R° + 32 = F°$.

—The principal sources of error in the mercurial thermometer, and inseparably connected with the instrument, however accurately constructed, arise from the inequality of caliber of the tube, and of the expansions of the mercury and glass. The caliber probably always varies slightly in different parts of the tube, beside that, from the usual method of drawing out the tubes, it is likely to be in form a very much elongated hollow cone. Hence, to make a standard or highly perfect thermometer, it becomes necessary in the outset to place the tube upon the carriage of a dividing engine for rectilinear scales (briefly alluded to under Dividing Engine, and of which that by Duboscq, of Paris, is the best now made), and moving through the tube a short column of mercury, to mark on it, by means of a small microscope with cross wires, and the graver of the instrument, the lengths of this column in the different parts. This process is the calibration of the tube. Dividing all these lengths with reference to some arbitrarily assumed number of degrees, or rather parts, a new and wholly arbitrary, but (for the caliber) perfect scale, is obtained; exposing to the vapor of hydrofluoric acid, the marks of the graver are more plainly etched upon the tube; and it is then verified by recurring to the use of the engine. The arbitrary degrees are then to be reduced to degrees of the scale required, and these being properly marked, and of course differing in length in different parts, a standard instrument is obtained. For a more full statement of the mode of calibration, see Professor J. P. Cooke's "Chemical Physics," vol. i. (Boston, 1860), or the original memoirs of Regnault, *Mémoires de l'institut*, vol. xxi. pp. 239, 328. Still, the rise observed in a thermometer tube is not the absolute expansion of the mercury, but the relative expansion, or difference between the increase of volume of the mercury and of capacity of the bulb and tube. Mercury expanding about 7 times more than glass, its relative is about $\frac{1}{7}$ less than its absolute expansion. Again, in view of the fact merely that mercury expands more rapidly at higher temperatures, the lengths of the degrees forming the scale should increase slightly from zero up, in order that these may correspond with equal variations of actual temperature. In thermometers generally, the marked degrees are of the same length throughout the scale; or they are of equal length between certain points ascertained by a standard, and correspond mathematically, not thermally, for all temperatures beyond the highest and lowest points so found. The error arising even from equal division between freezing and boiling points is very slight, since the degree has a mean length, a little too long below and too short above; but carrying the same divisions above boiling and below freezing point, it results that in the former part of the scale the temperature indicated is always higher, and in the latter part lower, than the actual temperature. Again, generally, the rate of expansion of glass increases about equally with that of mercury; and this fact sometimes nearly or quite corrects, or even over-compensates the variation in the volume of the mercury. But such correction cannot be relied on, since the rate of expansion differs much in different kinds or manufactures of glass, and even in the same tube under different circumstances. A result is, that two thermometers constructed with the greatest care seldom continue to agree through points much above or below the fixed points; and the uncertainty concerning the behavior of the glass must render absolute accuracy unattainable, and must introduce the question of possible variation into all scientific data collected from observations with two or more of these instruments. For the rates of variation in expansion of different kinds of glass, as determined by Regnault, see the works above referred to. It may be remarked, however, that good flint glass is best for the tubes, as most nearly and uniformly compensating the change in the mercury; while common or crown glass is irregular and less trustworthy. For the more accurate, or standard thermometers, the scale should be engraved on the tube itself, since the unequal expansion of a metal or ivory case or strip may introduce new sources of error; this effect is very nearly obviated, in the careful manufacture of the better class of common instruments, if time enough be allowed the tube, mercury, and case to acquire throughout the same temperatures, and the marking be carefully done. The length of the degree on the scale, and hence the delicacy or minuteness of indication of temperatures, depending on the relative capacities of bulb and tube, there is a gain in this respect from making the bulb large and the tube exceedingly fine. But, again, the large bulb is liable sensibly to reduce the temperature of the very medium or mass tested, and especially when the volume of the latter is small; while for sensibility in the way of quick response, also, the smaller the bulb the better. Hence, the effort is directed rather to securing smallness of caliber in the tube; and to allow of this, the back of the tube is enamelled white to show the column by contrast, and the bore is flattened or made elliptical, a broader side standing toward the eye. In the most delicate scales, the subdivision is seldom carried beyond 20 parts to the centigrade degree; a practised eye will then read to hundredths of the degree. The eye in careful reading should always be at the level of the top of the column; and the aid of a small telescope may be employed. In using a standard thermometer, both bulb and stem should be immersed in the medium; if this be impossible, a correction must be made for the length of column in the tube unacted on; and when the mass of the bulb itself must sensibly abstract from the temperature to be observed, a further correction for this error is required. Mercurial thermometers are liable to error from still other and more singular conditions. Owing to some change in the glass, either due to continued pressure of air, or more likely to slow rearrangement of the particles following the molecular disturbances by melting and blowing of the glass, the zero point slowly rises through a year or more, and sometimes to an extent of 1° or 2°. Hence, the tubes must never be used immediately after making, but laid aside at least 10 or 12 months before sealing and graduation. Despretz finds that this change may continue for an indefinite period. But sudden variations also occur, and either transient or permanent. As an example of the former, if a thermometer used for some time for ordinary temperatures have its zero point verified, and be then exposed for very little time to a heat at or above 212°, upon testing the zero point immediately after, it will be found (probably through permanence in degree of the expansion of the glass) lowered by .1° to .2°; and it may be some weeks in recovering its former position. In view of all these circumstances, it becomes necessary frequently to verify anew the 0 point in instruments for accurate observation. The utmost attainable accuracy is however secured only by use of a perfect air thermometer. (See Regnault's, in Cooke's "Chemical Physics," p. 584.) The common, cheap thermometers serve very well for such uses as observing the temperature of a room or a bath; but, as graduated with less precision, by comparison with a standard in a water bath, they are necessarily inaccurate, and differ much from each other, especially below 0° F. or much above the boiling point. Owing also to the very rapid contraction of mercury near its point of congelation, —39° F., the temperatures shown by any mercurial thermometer much below 0° F. are deceptive, being apparently lower than in reality; and such errors have even arisen as that of supposing that in some instances the mercury itself had not congealed until reaching —44° or —46°. Alcohol, commonly used where temperatures much below 0° F. are to be observed, is liable at such range to much variation, although it does not freeze even at —132° F.; and Capt. Parry, in his arctic voyages, observed differences of full 10° C. between alcohol thermometers by the best makers. For measurement of temperatures considerably above the boiling point of water, see PYROMETER. Bréguet's metallic thermometer is an application of the unequal expansions of different metals; a compound bar of platinum, gold, and silver is rolled into an extremely thin ribbon, which is coiled into a spiral, the platinum outermost, one end being fixed and the other acting on an index moving over a circular scale; the silver, expanding most with heat, tends to unbend the spiral, and moves the index. This thermometer is both exceedingly sensitive and accurate, and can be used for very high temperatures. Mr. Victor Beaumont, of New York, constructs a cheap and serviceable metallic thermometer, on the principle of the compound metallic bar carrying an index; the necessity of transmitting the movement through several pieces is likely to introduce inequalities of indication, but probably no more than in good mercurial thermometers; while advantages of these instruments are, that they are portable, prompt, and easily read, and may be used to measure temperatures ranging from below —39° to 1,200° F. A differential thermometer is a modification of the air thermometer, in which two large glass bulbs above are connected by a glass tube bent twice at right angles; the horizontal and parts of the upright tubes are filled in the common form with a colored liquid, which is depressed on either side as the corresponding bulb is more heated; thus the instrument indicates differences of the temperatures to which the two bulbs may be exposed. It is very sensitive; and by a scale the results it affords are comparable with each other.—It is often important to have means of knowing the highest or lowest temperatures, or both, occurring during a period when, or in situations such that, the observer cannot be present; and for this purpose, the registering instruments known as maximum and minimum thermometers have been devised. One of the simplest and best known is Rutherford's maximum and minimum. Two thermometers are affixed upon the same plate, their tubes bent at right angles just above the bulbs and placed horizontally, each with its scale. The maximum thermometer has in front of the mercury column a short piece of iron wire, which is pushed along by the advancing column, and left at the point where this begins to recede. For a new observation, the wire can be brought back to the column by moving a magnet near the tube, without. This wire, or index, is in transportation or handling liable to enter the mercury, and cannot usually be recovered without returning the instrument to the makers for refilling; so that many other forms of maximum have been devised to obviate this liability. Rutherford's minimum, however, sufficiently answers the desired purpose; it is filled with colored alcohol, and contains floating in this a small enamel cylinder, with beads on its ends nearly of the size of the bore. The alcohol in expanding readily passes this index, but in contracting, by adhesion it draws it back along with the head of the column, and thus leaves it at the lowest point reached. For a new observation, it is only necessary to tilt down the tube, when the index moves along to the head of the alcohol column again. As an improvement of the maximum thermometer, Prof. Phillips, of England, detaches a small portion of the mercury column by an interposed bubble of air, to serve as the index; while the instruments of Six and Walferdin are capable of great accuracy, and without risk of derangement, but require considerable trouble in their management. In Negretti and Zambra's maximum, in a short, obliquely ascending portion of the tube, between the bulb and the horizontal part, is fixed a small enamel rod, which, though it does not close the tube against the force of the expanding mercury, presents obstruction sufficient to break the column, if kept horizontal, when it begins to return; the column thus preserves almost exactly the greatest advance made, and shows the highest temperature to which it has been exposed. To prepare for a new observation, the instrument is held vertically and shaken, when the mercury returns; this operation, however, may lead to accident. Mr. James Green, of New York, appears (1860) to have removed the objections to the previous forms of maximum thermometer, and produced a highly simple and perfect instrument. In this the tube is straight throughout, but the bore is for a short space just above the bulb contracted to very small size—this being readily accomplished with the elliptical bore by compressing the tube upon the posterior side; and the size is made such that, while expansion forces the mercury through in regular and minute pulses or globules, the space upon the mercury's tending to return proves so small that the cohesive forces give to the liquid, as in the last named, the globular surface (usually ascribed to repulsion of the glass), and so break the column, leaving it to show, as above, its highest point. The instrument is provided with a suitable support, from a pin upon which it can be safely swung with a pendulous or revolving movement, when the centrifugal force suffices to return the mercury, as required for a new observation. For an account of Mr. S. W. Hall's thermograph, or continuously registering thermometer, for meteorological observations, see "Journal of the Franklin Institute," June, 1859; and for Dr. James Lewis's registering metallic thermometer, see "Annual of Scientific Discovery" (Boston, 1861).—The following are among the points of peculiar interest in the known range of temperatures:

—220° F.	Greatest artificial cold measured (Natterer).
—166° "	" " " " (Faraday).
—150° "	Liquid nitrous oxide freezes. "
—71° "	Liquid carbonic acid freezes. "
—70° "	Greatest natural cold observed at Fort Reliance, by Back. (Doubtful.)
—58° F.	Estimated temperature of planetary space.
—56° "	Greatest natural cold observed by a verified thermometer (Sabine).
—47° F.	Sulphuric ether freezes.
—39° "	Mercury freezes.
—7° "	Water with alcohol, in equal parts, freezes.
+20° "	Strong wine freezes.
32° "	Water freezes.
50.70° "	Mean temperature of London.
81.5° "	Mean temperature at the equator.
99.5° "	Mean temperature of human blood.
117.8° "	Highest natural temperature observed, in Upper Egypt (Burckhardt).
980° F.	Red heat (Daniell).
1,141° "	Heat of a common fire (Daniell).

Boiling points: Wood spirit, 151°; alcohol, 173°; water, 212°; mercury, 662°.

Melting points: Tin, 442°; lead, 594°; silver, 2,233°; cast iron, 3,479°.

THERMOPYLÆ, or simply PYLÆ (from ϑερμος, hot, and πυλη, gate), a celebrated defile between Thessaly and Locris, the only passage for an enemy from northern into southern Greece, situated between Mt. Œta and an inaccessible morass forming the edge of the Maliac gulf. Between these two was a road wide enough only for a single wheel track, which formed the western gate. At about a mile to the eastward Mt. Œta again approached the sea in a similar manner, and the passage there formed the eastern gate. The space between these two gates was wider, but full of warm springs, which, many years before Leonidas occupied the pass, the Phocians had so conducted over the ground as to render the pass impracticable. They had also built a wall near the western gate to prevent the incursions of the Thessalians, which was in ruins when the Lacedæmonians came. The present appearance of Thermopylæ is different, owing to the change made in the configuration of the road and the course of the rivers. The Maliac gulf has been rendered smaller by the accumulation of deposits made by the rivers; the mountain is not now near the sea; the course of the Spercheus has been changed, emptying now into the sea S. of Thermopylæ instead of N. of the pass, as it did in the time of Herodotus; the rivers Dyras, Melas, and Asopus, which when Herodotus wrote reached the sea between Thermopylæ and the mouth of the Spercheus, have now become affluents of the latter; and the level of the soil has been raised by the deposit from the warm springs. The defence of this pass made by Leonidas has immortalized its name. (See GREECE, vol. viii. p. 442.) It has also been since that time the scene of several memorable actions. Through the neglect of the Athenians, and against the earnest remonstrances of Demosthenes, Philip was allowed to occupy it, and thus gain a foothold in southern Greece. Here the Greeks assembled in 279 B. C. to repel Brennus and the Gauls, and in 191 Antiochus the Great of Syria ineffectually labored to prevent the Romans from passing the defile. Several severe contests also took place here during the late Greek war of independence. On the heights above Thermopylæ the remains of three Hellenic fortresses are still to be found.

THÉROIGNE DE MÉRICOURT, Anne Joseph, or Lambertine, a noted woman in the French revolution, born at Méricourt, in the vicinity of Liége, in 1759, died in 1817. Though the daughter of poor peasants, she received an excellent education, but had to leave her native village on account of her dissolute life. Becoming acquainted with the Prussian baron so famous as "Anacharsis Clootz," she removed with him to Paris, became known as a courtesan, was on terms of intimacy with several of the revolutionary leaders, and took a large share in all insurrectionary movements. She was instrumental in bringing about the popular manifestation of Oct. 5 and 6, 1789, was loud in her denunciations of the queen, and entered Paris in triumph at the head of the dreadful procession which brought the royal family from Versailles to the Tuileries. On July 17, 1791, she figured in the mob dispersed in the Champ de Mars by the national guard under Lafayette and Bailly. Having visited her native country with a view to revolution, she was arrested, taken to Vienna, and imprisoned, but at the end of a few months sent back to France, where she assisted in the insurrections of June 20 and Aug. 10, 1792. On the latter day she mercilessly murdered Suleau, the editor of the *Actes des Apôtres*, who had ridiculed her in his paper, cut off his head and put it on the top of a pike, while trampling his corpse under her feet. She also shared in the massacres of September. A little later, being suspected of acting in behalf of the duke of Orleans and conspiring with the Girondists, she lost her popularity; and having once undertaken to vindicate Brissot in the Tuileries garden, she was seized by a number of enraged women, who stripped her and publicly whipped her. She became a raving maniac, and was confined in La Salpêtrière, where she remained insane for years.

THESEUS, the great legendary hero of Attica, was according to the commonly received legends the son of Ægeus, king of Athens, and Æthra, daughter of Pittheus, king of Trœzen. Ægeus upon his departure from Trœzen hid his sword and shoes under a stone, and charged Æthra if she gave birth to a son to send him to Athens as soon as he was able to roll away the stone. When he arrived at maturity his mother informed him of his parentage, and taking possession of the tokens he set out for Attica by land instead of sea, as the country was infested with robbers, and he was anxious to signalize his prowess. On the road he destroyed various robbers and monsters, and arriving at Athens was recognized by his father, but narrowly escaped death from the hands of Medea. He also engaged in a war with the Pallantids, the sons and grandsons of Pallas, the brother of Ægeus, in regard to the succession to the throne, and was victorious. His first great exploit was the capture of the Marathonian bull, which had ravaged the neighboring country. In this same enterprise Androgeos, son of Minos, king of Crete, had perished; and in return the Athenians had been compelled to send to Crete every 9 years a tribute of 7 young men and 7 maidens to be given up to the Minotaur, who were offered to him in a labyrinth constructed by Dædalus, from whose numerous passages no one could escape. When the third period for sending the victims arrived, Theseus came forward and offered himself, with the intention of slaying the monster. Arriving at Cnossus, he gained the affections of Ariadne, daughter of the king of Crete, and was furnished by her with a sword and a clue of thread, with which he killed the Minotaur and escaped from the labyrinth. Hereupon he quitted Crete with his companions, carrying off Ariadne, whom however he left behind at the island of Naxos. It had been agreed that in case the expedition should be successful, Theseus on his return should hoist white sails instead of the black ones which this vessel was in the habit of carrying; but this arrangement was forgotten, and Ægeus, imagining his son was destroyed, threw himself into the sea. Theseus now ascended the throne, and was engaged in a war against the Amazons, who had not recovered from the losses sustained by them from the attack of Hercules. He invaded their territory, defeated them, and carried off their queen Antiope. In revenge these formidable women crossed the Cimmerian Bosporus on ice, entered Attica, and marched to Athens itself, and were finally vanquished after a long and bloody battle in the streets of that city. Beside these there are but few of the ancient heroic enterprises in which Theseus does not figure. He was one of the Argonauts, was engaged in the Calydonian hunt, fought with Pirithous and the Lapithæ against the Centaurs, and also assisted Adrastus in regaining the bodies of those slain before Thebes. Aided by Pirithous, he carried off Helen from Sparta when she was only 9 years old. Attica was in consequence invaded by Castor and Pollux. Menestheus incited the Athenians to rise against their ruler; and Theseus, finding it impossible to sustain himself, retired to the island of Scyros, where he was destroyed by the treachery of King Lycomedes. In 476 B. C. the oracle directed his bones to be brought from the island to Athens, but it was not until 469, when Scyros was taken by Cimon, that it was pretended the body was found. His bones were laid in the interior of the city, and the temple called the Theseum, built over the spot, served as a sanctuary for poor men in dread of the powerful, and for slaves in case of cruel treatment. At the battle of Marathon Theseus was reported to have been seen armed and aiding the Athenians against the barbarians. Festivals in his honor were celebrated on the 8th day of each month, and the festival termed Oschophoria was said to have been originated by him after his arrival from Crete. To him was popularly ascribed the origin of the Pyanepsia and the re-institution of the Pythian games. Thucydides states that the great political revolution, by which the petty independent states of Attica were consolidated into a united body with Athens at its head, was believed to have been effected by him; but there is no more historical proof of this than that he was actually a living person. The account of him throughout is entirely legendary, although the later writers endeavored to give it a historical coloring.

THESIGER, Sir Frederic (Lord Chelmsford), an English statesman and jurist, born in London in July, 1794. In 1803 he entered the navy as midshipman on board of a frigate, and in 1807 was present at the bombardment of Copenhagen; but on the death of his elder brother he left the navy and entered the profession of law, and in 1818 was called to the bar at Gray's Inn. He rapidly acquired great reputation, especially in the conduct of election cases, and in 1834 was appointed a king's counsel. He entered parliament in 1841 as member for the borough of Woodstock, and held a seat for different constituencies till 1858; his first speech was made in opposition to the war with China. In 1844 he was made solicitor-general in the administration of Sir Robert Peel, and knighted, and in 1845 succeeded Sir W. A. Follett as attorney-general, but the year following resigned on the retirement of his party. While a member of this government he strongly supported the free trade policy. In 1852 he was reappointed attorney-general in the administration of the earl of Derby, which in November gave place to that of Lord John Russell. On the return of Lord Derby to power in March, 1858, he was made lord chancellor and raised to the peerage as Baron Chelmsford, retiring with the rest of the cabinet in April, 1859.

THESPIS, the founder of Greek tragedy, a native of Icarus in Attica, flourished in the time of Pisistratus. The ancient traditions represent him as the inventor of tragedy, and to him is also ascribed the invention of masks. According to one account, probably a misconception, though sanctioned by Horace, Thespis was in the habit of travelling through Attica at the time of the festival of Dionysus in a wagon, and upon this portable stage performed comic plays. Another statement is that he found tragedy already existing in Athens, but that he made in it the simple and important alteration of introducing an actor for the sake of giving rest to the chorus. Of the character of his tragedies there is also doubt, some maintaining that they were wholly satyric in their nature, others again that he wrote serious compositions. His tragedies have all perished, but the titles of 4 have been preserved. Of the personal history of Thespis scarcely any thing is known except that his first representation was in the year 535 B. C.

THESSALONIANS, Epistles to the, two canonical books of the New Testament, addressed to the church at Thessalonica by the apostle Paul. They are expressly referred to by Irenæus, Clement of Alexandria, and Tertullian. In modern times the authenticity of both epistles, and especially of the second, has been doubted by J. E. Ch. Schmidt (in his "Introduction to the New Testament"), by Baur (*Paulus der Apostel Jesu Christi*, p. 485 *et seq.*) and the entire Tübingen school, by Weisse (*Philosophische Dogmatik*, vol. i. p. 146), and many others; against whom special treatises in support of their authenticity have been written by W. Grimm (*Die Echtheit der Briefe an die Thessalonier*, 1850), Reiche (*Authentiæ posterioris ad Thessalonienses Epistolæ Vindiciæ*, Göttingen, 1830), Lünemann (in the introduction to his commentary on the two epistles), and others. The first epistle to the Thessalonians is, according to the common opinion, the first of all the Pauline epistles in point of time, and is supposed to have been written soon after the foundation of the church during Paul's first sojourn at Corinth, when Silas and Timothy had returned from Macedonia, about A. D. 52 or 53. The immediate occasion for this epistle seems to have been the favorable report which Timothy had brought of the faith of the Thessalonians, and the desire of the apostle to strengthen this faith. It consists of two parts: the first (chap. i. to iii.) contains an expression of the feelings of the apostle respecting the religious condition of the Thessalonians, and the reception which the apostle found with them; the second part contains an exhortation to holiness (iv. 1-12), an instruction on the fate of the dead at the expected return of Christ (iv. 13-18), an admonition to be always prepared for that event (v. 1-11), several other admonitions, and the conclusion. The second epistle was written soon after the first, in the year 53 or 54, and was evidently designed to correct some mistakes into which the church had fallen, especially respecting the coming of Christ. The apostle commends the Thessalonians for their patience and faith in their persecutions, and announces that those who trouble them will be punished (ch. i.); he shows that the arrival of Christ was not near at hand, but must be preceded by a great apostasy and the appearance of the Antichrist (ii. 1-12), and gives them appropriate admonitions (ii. 13-17, and iii.).—There are special commentaries on these epistles by Flatt (Tübingen, 1829), Schott (Leipsic, 1834), Jowett (London, 1856), Lünemann (Göttingen, 1859), Ellicott (2d ed., 1862), and others.

THESSALONICA. See Salonica.

THESSALY, the largest political division of ancient Greece, comprising in its fullest extent that tract of country lying between Thermopylæ and the Cambunian mountains in one direction, and between the range of Pindus and the Ægean sea in the other. Thessaly proper, however, was the plain included between the Cambunian mountains on the N., Ossa and Pelion on the E., Mt. Othrys on the S., and the Pindus range on the W. This plain, whose natural enclosure of mountains is broken only at the N. E. by the vale of Tempe, was the most fertile region and the largest space of land continuously productive in Greece, and was supposed by its inhabitants to have once been a lake, of which the lakes Nessonis (now Karatjaïr) and Bœbeis (Karla) were the remains. It was drained by the river Peneus and its tributaries, and was divided into two plains, which in antiquity were called Upper Thessaly and Lower Thessaly; the former embracing Thessaliotis and Histiæotis, lying between Æginium in the N. and Thaumaci in the S., and having Pharsalus for its chief city; the latter, Pelasgiotis, stretching from Mts. Titarus and Ossa on the N. to Mt. Othrys and the gulf of Pagasæ on the S., and having Larissa as its most important town. Thessaly proper was early divided into the four districts of Thessaliotis, Histiæotis, Pelasgiotis, and Phthiotis; and this division, the origin of which is sometimes ascribed to Aleuas, the founder of the Aleuadæ, was continued down to a very late time. In addition to Thessaly proper, the name was extended over Malis, a narrow valley lying between Mts. Othrys and Œta, and through which the river Spercheus enters into the Maliac gulf; and to Magnesia, a region lying along the coast and stretching between the vale of Tempe and the gulf of Pagasæ.—The Thessalians were said to have been originally emigrants from Thesprotia in Epirus, who conquered the Pelasgian inhabitants of the plain of the Peneus, which is said by Herodotus to have then been called Æolis. During the historic period there were 3 classes inhabiting the country. The first was a body of rich oligarchical proprietors, who owned most of the soil. Of these the most powerful families were the Aleuadæ of Larissa, the Scopadæ of Crannon, and the Creondæ of Pharsalus; the second were the subject Achæans, Magnetes, and Perrhæbi, who however retained their tribe names and separate votes in the Amphictyonic council; the third were the Penestæ or serf cultivators of the soil, who could not however be sold out of the country, and who kept up among themselves the relations of family and community. The fertility of the plain, upon which grain and cattle were raised in abundance, supported a large population, and especially a proud, disorderly, and faithless, but at the same time hospitable nobility. As here the finest horses in Greece were bred, Thessaly was distinguished for the excellence of its cavalry; but its infantry is little mentioned. The four divisions of the country formed a political union, existing rather in theory than in fact; and to enforce obedience to the common authority a chief or *tagus* was sometimes elected; but there were almost constantly feuds between the larger cities, each of which had dependent upon it a number of smaller towns. The language was a variety of the Æolic dialect.—The constant dissensions prevailing in Thessaly prevented it from occupying its rightful position in Greece. The inhabitants were early engaged in a constant war with the Phocians; they joined by constraint the army of Xerxes in his invasion of Greece, but took no part in the Peloponnesian war, though favoring on the whole the Athenians. In the latter half of the 4th century B. C. Jason, a man of great ability, gained the supreme power at Pheræ, and meditated not only the conquest of Greece, but the overthrow of the Persian empire. He succeeded in reducing all Thessaly to his authority, but before he had time to mature his designs, he was assassinated. The country subsequently fell into the hands of Philip of Macedon, and formed a part of the Macedonian monarchy until the defeat of Philip V. at Cynoscephalæ in 197 B. C., after which time it came under the Roman dominion, when the government was placed in the hands of the more wealthy persons, who used to meet in Larissa.—Thessaly now forms a part of the Turkish province of Saloniki (Salonica), and, though laid down on the maps as a separate district, is not recognized as such by the government. Its population is estimated at about 300,000, five sixths of whom are Greeks.

THETIS, in Greek mythology, a Nereid, the wife of Peleus, and the mother of Achilles. She dwelt in the depths of the sea with her father Nereus, and was sought in marriage by both Jupiter and Neptune; but the gods immediately relinquished their suit when it was declared by Themis that the son of Thetis should be more illustrious than his father.

THÉVENOT, Jean de, a French traveller, born in Paris, June 6, 1633, died in Persia, Nov. 28, 1667. The wealth inherited from his father enabling him to gratify his taste for travel, he visited England, Holland, Germany, and Italy, and in 1655 departed for the East, by way of Sicily, Malta, and Constantinople, visiting and exploring Asia Minor, Egypt, and Tunis, and returning home, after 7 years' absence, in 1662. After preparing his *Voyage du Levant* (4to., Paris, 1664), he sailed again for the East, sojourned 5 months in Ispahan, examined the most famous remains of Persia, went to Surat in 1666, and for nearly one year travelled over the Indian peninsula. His health being impaired, he started on his return home by way of Persia, but died at Miana, a small place 90 miles S. of Tabriz. Until a few days before his death he kept a diary, from which his friends were enabled to publish his account of Persia, as a sequel to his *Voyage du*

Levant, and his still more important *Voyage contenant la relation de l'Indoustan, des nouveaux Mogols et des autres peuples et pays des Indes* (4to., 1684). His works were afterward collected under the title of *Voyages de M. Thévenot tant en Europe qu'en Asie et en Afrique* (5 vols. 12mo., Paris, 1689), and have been translated into Dutch, English, and German. He is said to have introduced coffee into Paris.

THIBAUT IV. or VI. as count of Champagne, I. as king of Navarre, a French *trouvère* or poet, born in 1201, died July 8, 1253. A posthumous son of Count Thibaut III. or V., he was educated at the court of Philip Augustus under the supervision of his mother, Blanche, daughter of Sancho the Wise, king of Navarre, and became an early adept of the "gay science." Several of his poems were addressed, under an assumed name, to Blanche of Castile, the queen of Louis VIII., whom he loved to distraction, although she was 14 years his senior. When her husband died prematurely at Montpensier in 1226, while returning from an expedition against the Albigenses, Thibaut, who accompanied him, was suspected, but on no plausible grounds, of being his poisoner. He soon after joined the league of feudal lords who rose against Blanche, then regent; but her influence brought him back to his duty to the king, and through his assistance she was enabled to baffle the designs of the confederates. In 1234, Sancho dying without male issue, the count of Champagne inherited the kingdom of Navarre in right of his mother. In 1239 he proceeded to the Holy Land; but he was unfortunate as a crusader, met with a dreadful defeat near Gaza, Sept. 13, 1240, and had to pay a heavy ransom for the release of his brother, who had been taken prisoner. His provinces were very prosperous under his government, and remains of edifices built by him are still found in Champagne; and he was a patron of literature and the fine arts. Although of a kindly disposition, he yielded to the religious opinions of his time, and allowed the Albigenses to be persecuted in his dominions; he even assisted, May 13, 1239, in the burning at the stake of 83 of those heretics, at Montrimer, near Vertus. He spent his latter years mostly in Navarre, and died there. Among his poems, 66 songs have been preserved and published by Lévesque de la Ravallière (2 vols. 12mo., Paris, 1742; best edition by Rocquefort and Michel, Paris, 1829). Notwithstanding the obsolete language in which they are couched, their elegance and gracefulness are still remarkable.

THIBAUT, Anton Friedrich Justus, a German jurist, born in Hameln, Hanover, Jan. 4, 1774, died in Heidelberg, March 28, 1840. He was educated at the universities of Göttingen, Königsberg, and Kiel, and in 1799 became professor of law in the last named university, and in 1802 in that of Jena. In 1805 he accepted a professorship in Heidelberg, and remained there until his death. In 1826 he was made privy councillor of Baden, in 1830 knighted, and in 1834 made a judge in the tribunal of arbiters for the domestic affairs of Germany. His great work is his *System des Pandektenrechts* (2 vols. 8vo., Jena, 1803), which has passed through many editions. In 1814 he published a treatise "On the Necessity of a Common Code of Laws for Germany," in which he placed himself at the head of a movement designed to form one general code, as had been done in France, instead of the confused administration of the laws under the old German, the Roman, and the French codes which had hitherto prevailed. It was opposed by Savigny in a treatise "On the Aptitude of the Present Age for Legislation and Jurisprudence," in which he maintained that Germany was not yet ready for a common legislation. Among Thibaut's other works are: *Juristische Encyklopädie und Methodologie* (Altona, 1797); *Versuche über einzelne Theile der Theorie des Rechts* (2 vols., Jena, 1798); *Theorie der logischen Auslegung des Römischen Rechts*, (Altona, 1799); *Ueber Besitz und Verjährung* (Jena, 1802); and *Civilistische Abhandlungen* (Heidelberg, 1814). He also founded and was one of the editors of the *Archiv für civilistische Praxis* (Heidelberg, 1818 *et seq.*) and the *Heidelberger Jahrbücher*. As a musical critic he wrote *Ueber Reinheit der Tonkunst*, which brought him into a violent controversy with Nägeli of Zürich. His posthumous works on jurisprudence were published by Gurpet in 2 vols. (Berlin, 1841-'2).

THIBET, Tibet, or Tubet, a name given by Europeans to an extensive region of central Asia, called by the natives Bod or Bodyul, "Land of Bod," and by the Chinese Si-dzang, lying between lat. 27° and 36° N. and long. 78° and 104° E.; bounded N. by Chinese Toorkistan, E. by China, S. by Burmah and Hindostan, from which it is separated by the Himalaya chain, and W. by Khoondooz and Cashmere, formerly the dominions of Gholab Singh; area estimated at 693,000 sq. m.; pop. about 6,000,000. It forms the southernmost of the three great table lands of central Asia, and the Kuenlun mountains on its northern boundary are the true watershed between the streams flowing into the Indian ocean and those into the lakes and seas of N. W. Asia. Thibet proper comprises two provinces, Eastern and Western Thibet, and belongs to the Chinese empire. Bultistan or Little Thibet, and Ladak or Middle Thibet, once forming part of it, are now tributary to Cashmere, and Bootan is partly independent and partly tributary to Thibet. The principal towns are Lassa or H'Lassa, the capital of Thibet and the sacred capital of all Buddhistic countries, a city in the same latitude with Cairo, Bassorah, Shanghai, and New Orleans, but with a climate almost as severe as that of St. Petersburg; Teshoo-Loomboo, the capital of Western Thibet, lying near the Sanpoo, a city of 20,000 inhabitants; Jega-Gungar and Shigatze, each with 100,000 inhabitants;

Tashigong, Gardikh or Gertopé on the Indus, Chaprung, Toling, Daba on the Sutlej, Bathan on the Kincha, and Tsiamdo on the Me-kiang. The Chinese viceroy resides at Teshoo-Loomboo.—Thibet has numerous lakes, the largest of which are Koko-nor and Tcharin-nor, near the sources of the Hoang-ho; Tengri-nor and Paltee, without outlets; Rhawan Rhad, 15,000 feet above the sea; and Mansarowar, at the source of the Sutlej. Nearly all of these lakes are brackish. The head waters of most of the great rivers of S. and S. E. Asia are within the limits of Thibet, as the Sutlej, the Indus, the Jumna, and 2 or 3 other affluents of the Ganges, the Brahmapootra, the Irrawaddy, the Salwen, the Hoang-ho, and the Yang-tse-kiang. The country is one of the most elevated on the globe, being surrounded by lofty mountain chains, and, though presenting a varied surface of hill and valley, seldom except in its lowest valleys less than 10,000 feet above the level of the sea, while the height of the greater part is 14,000 feet or more. The N. E. part of Thibet is a desert, cold and barren; branches of the Karakorum range, itself a branch of the Himalaya, traverse the country from W. to E., and the chain of Kuen-lun sends out its spurs in the E. The southern portion is less wild and alpine in character; and along the N. slope of the Himalaya, especially toward the W. part, are found fresh water pleistocene deposits. Generally, especially in the north, metamorphic rocks alternate with belts of granite. The soil is sterile except in the valleys. The climate in the higher districts is very cold and dry; timber never rots, but becomes so dry as to break from excessive brittleness; the flesh of animals exposed to the air dries till it can readily be reduced to powder, and is preserved for years in that condition, forming a common article of food. The limit of perpetual snow is higher on the Thibetan than on the Indian side of the Himalaya; a singular fact, which is attributed to the radiation from the sandy deserts. It varies from 16,600 to 18,000 feet above the sea, while in India it descends even below 13,000 feet, and under the equator it is usually between 15,000 and 16,000. The prevalent diseases are goitre, syphilis, ophthalmia, hydrophobia, and small pox. The mineral productions of Thibet are very abundant. Gold is found in nuggets and veins, and in the sands of several of the rivers. Silver, mercury, native cinnabar, lead, iron, and rock salt are found in mines; but the want of fuel prevents any very large production. Lapis lazuli, turquoises, sulphur, borax, and nitre are also abundant. There are numerous mineral and thermal springs. The vegetation is scanty; there are few forest trees; the cedar and birch are the principal trees of the mountainous districts, and in the valley of the Mouran the apple, fig, pomegranate, apricot, peach, vine, and several varieties of nuts flourish. Wheat and rice are cultivated sparingly, and some buckwheat, but gray or black barley is the principal grain and the chief article of diet. The number of animals is greater than would be expected from the scantiness of vegetation; the wild cat, tiger, leopard, lynx, badger, and bear are the principal carnivora; the graminivorous animals of Europe are nearly all found there, and in addition the yak or grunting ox, the musk deer (both said to be aboriginal there), the elephant, wild ox, buffalo, goat, the argali with its horns weighing 100 lbs., and the bhoral or long-haired sheep. Wild fowl and fish are abundant, but Lamaism prohibits them as articles of food.—The inhabitants belong to the Mongol race, and were originally nomadic. They are pliant and agile, and usually brave, generous, frank, and honest. There are also some Bootanese and Katchi or Cashmerians, who are workers in metals and merchants. The practice of polyandry is common, one woman being the wife of all the brothers in a family. The Thibetans cultivate the soil wherever it is arable, but are not much skilled in agriculture. They are very ingenious workers in gold and silver and precious stones, and make very fine woollen cloths, shawls, &c., from their fine wool and the hair of the shawl goat. Sacking and other articles are also woven in considerable quantities for the Chinese market. Cloths are dyed with great skill, and the manufacture of pottery and of idols is a thriving trade. The traffic with China is considerable, amounting to about $4,000,000 per annum. There is also a brisk trade with Nepaul, Bootan, Bengal, Assam, and Cashmere. The two first named countries obtain all their Chinese goods through Thibet. The roads of Thibet are bad, and impede the commerce of the country greatly.—The language, which is common to Thibet and Bootan, and hence called indifferently Thibetan or Bhotanta, is classed with the monosyllabic languages, though possessing some polysyllables. Its alphabet is phonetic, reads from left to right, and is evidently borrowed from the Sanscrit; the language however owes most of its derivatives and some of its root words to the Chinese. It is copious and well adapted for the expression of philosophical and religious ideas. There is an extensive literature, mainly composed however of translations and commentaries on the Buddhist sacred books. The religion of Thibet is the worship of the dalai or grand lama. (See LAMAISM.) There are some Mohammedans in Western Thibet, chiefly natives of Cashmere, and, according to M. Huc, about 8,000 Roman Catholics.—As a kingdom Thibet is said to date from A. D. 313. Buddhism was introduced in the 4th or 5th century. It became tributary to China in 1648, and the amount of the tribute was increased in 1724; but as the Chinese government renders homage to the dalai lama, and pays a sum for the support of his worship fully equal to that received as tribute, the amount paid by Thibet as a tributary nation is not of much importance. The Chinese government has its governors or representatives in most of the principal towns, and maintains a force of 60,000 soldiers in the country. The governors exert considerable influence over the Thibetan government, though it is professedly independent. The temporal as well as spiritual ruler is the dalai lama, but it is only in matters of the highest importance that he interferes. Most of the ordinary business of state is managed by his vicegerent, the *nomekhan*, and the four *kalons* or ministers, who are appointed by the grand lama for life. On the death of the grand lama the *khutukhtu* or grand council, composed of the highest lamas or priests, appoint his successor, or rather discover the body into which his soul has transmigrated. Some of the members of the *khutukhtu* are governors of the principalities into which the provinces are divided.—See Huc, "Recollections of a Journey to Tartary, Thibet, and China during the Years 1844–'6," translated from the French (New York, 1856); and Turner, "Embassy to the Court of Teshoo Lama in Thibet" (London, 1800). The forthcoming work of the brothers Schlagintweit on the region of the Himalaya will contain much valuable information on Thibet.

THICK-KNEE, the common name of the wading birds of the plover family and subfamily *œdicneminæ*, peculiar to the old world. In the genus *œdicnemus* (Temm.) the bill is about as long as the head, with straight culmen, depressed at the base and swelled at the apex, with the nostrils in a deep longitudinal groove on each side; wings moderate and pointed, 2d quill the longest; tail long and wedge-shaped; legs long, swollen about the knees, with bare part of tibiæ and tarsi reticulated; anterior toes partly united by a web, and hind toe wanting. There are about half a dozen species, rearing their young in temperate regions and passing the winter in warmer latitudes, migrating at night and with great swiftness; they frequent dry and uncultivated places, hiding by day and feeding during twilight and at night on worms, slugs, insects, and small reptiles and mammals; they are quick runners and powerful fliers; the eggs are generally 2, laid in a slight hollow in the ground, and the young follow the mother as soon as hatched. The common thick-knee (*Œ. crepitans*, Temm.) is about 17 inches long and 2 feet in alar extent; the bill 2 inches, yellowish, black toward the point; head, neck, and upper parts pale tawny brown, with a dash of black down each shaft; under parts paler, yellowish white on abdomen; a pale band above and below the eyes, and across the wings; quills black. It is abundant in Asia, Africa, and S. Europe, visiting Great Britain in summer, preferring sandy plains; it is called Norfolk and great plover, and land or stone curlew, from the resemblance of its cry to that of the common curlew; the flesh of the young is said to be delicious; the eggs are ashy white, with olive brown blotches, and 2½ inches long. Other species are found in Africa, Australia, and the East Indies. In the genus *esacus* (Less.) the bill is longer and stronger, curved upward at the tip, and the sides are angular at the base; they are found in the wide sandy banks of the large rivers of India during winter, migrating northward as summer advances; the food consists of crabs and other hard-shelled crustaceans. Species occur in the East Indian archipelago and in Australia. This sub-family seems to form the connecting link between the plovers and the bustards.

THIERRY, Jacques Nicolas Augustin, a French historian, born in Blois, May 10, 1795, died in Paris, May 28, 1856. After completing his collegiate studies at Blois, he entered the normal school at Paris in 1811, and in 1813 was appointed to a professorship in a departmental college. In 1814 he returned to Paris, became acquainted with St. Simon, and acted as his amanuensis; he even styled himself his "adoptive son" upon the title page of one of their joint productions; but, being indisposed to sanction all the socialistic views of his master, he left him in 1817, and became a contributor to the *Censeur Européen*, in which he published a "View of the English Revolutions," an outline sketch of one of his future great works, and several other essays, mostly upon the history or literature of England. In 1820, the publication of the *Censeur Européen* having ceased, he connected himself with the *Courrier Français*, to which he contributed *Dix lettres sur l'histoire de France*. In the beginning of 1821 he exclusively devoted himself to the composition of a work which was to be the embodiment of his new theory of writing history. After 5 years' incessant labor, his *Histoire de la conquête de l'Angleterre par les Normands* appeared (3 vols. 8vo., 1825), the success of which was unparalleled, but dearly paid for; his sight had been impaired to such a degree that he was henceforth unable to read or write. Vainly did he try to recover it by rest and travel; one year later he was entirely blind. Nothing daunted by this misfortune, he resumed his wonted pursuits with the assistance of a secretary, first employing in that capacity Armand Carrel, afterward so celebrated as a journalist. In 1827 he published his *Lettres sur l'histoire de France*, which, beside the 10 letters that had previously appeared in the *Courrier Français*, comprised 15 new ones, presenting a most graphic picture of the establishment of communes in France. In 1829 he was elected a member of the academy of inscriptions. A nervous disease now preyed upon him, and while at the baths of Luxeuil in 1831 he made the acquaintance of Mlle. Julie de Querangal, a young lady of literary attainments, who became his wife. Through her help and that of a secretary, he produced, from 1831 to 1835, a series of narratives from the history of France in the 6th century, republished under the title of *Récits des temps Mérovingiens, précédés des considérations sur l'histoire de France* (2 vols. 8vo., Paris, 1840), which was considered to fully justify the name *Homère de l'histoire* previously bestowed upon him by Châteaubriand, and for which he received during 15 years the Gobert prize for the most important historical work. Meanwhile he had reprinted, under the title of *Dix ans d'études historiques* (8vo., 1834), with a prefatory sketch of his historical views and performances, such of his papers as had appeared from 1817 to 1827 in various periodicals, and were not incorporated in his other works. In 1835 he was intrusted by M. Guizot, minister of public instruction, with the direction and control of the large publication entitled *Documents inédits de l'histoire du tiers état*, as an introduction to the first volume of which he wrote an *Essai sur l'histoire de la formation et des progrès du tiers état*, which was separately reprinted in 1853, and is, as the author himself expressed it, the "summing up of all his researches upon the history of France." His works have been reprinted many times; the best editions are the last, issued under the supervision of their author (5 vols. 8vo. and 10 vols. 12mo., Paris, 1854). The most important have been translated into English and German.—AMÉDÉE SIMON DOMINIQUE, brother of the preceding, born in Blois, Aug. 2, 1797, is also a distinguished historian. His *Histoire des Gaulois* (3 vols. 8vo., Paris, 1828) was a valuable addition to historical literature. During the reign of Louis Philippe he became prefect of Haute-Saône and master of requests in the council of state; and while fulfilling his official duties, he published the *Histoire de la Gaule sous la domination Romaine* (2 vols. 8vo., 1840–'42), a sequel to his first work. In 1851 he returned to his historical pursuits, with which he is still occupied. His *Histoire d'Attila, de ses fils et de ses successeurs* (2 vols. 8vo., 1856) is full of curious information. He is now (1862) publishing in the *Revue des deux mondes* a new series of historical papers entitled *Trois ministres de l'empire Romain sous les fils de Théodose, Rufin, Eutrope et Stilicon.*

THIERS, LOUIS ADOLPHE, a French historian and statesman, born in Marseilles, April 16, 1797. The son of a poor workman, through the patronage of some influential relations he was admitted to the college of his native town, afterward studied law at Aix, where he became acquainted with M. Mignet, and was graduated in 1820, but instead of following the profession devoted his attention to history and philosophy. After winning a prize at the academy of Marseilles for his panegyric of Vauvenargues, he went to Paris with Mignet in Sept. 1821, and two months later, through Laffitte's patronage, became a contributor to the *Constitutionnel*. His quick perception and versatility, ready wit and sprightliness of style, boldness of attack and ability as a controversialist, admirably fitted him for the daily labor of a journalist, and he soon reached a leading position. A shrewd political writer and literary critic, he proved also a skilful judge of the fine arts in his *Salon de* 1822 (8vo., Paris, 1822), and an elegant tourist in *Les Pyrénées* (8vo., 1823). Through activity and skilful management, he now found himself in easy circumstances, while, in spite of his awkward manners and strong provincial accent, he was the welcome guest of Laffitte and other leaders of the opposition. He profited by his intercourse with many of the most eminent men of the preceding generation to gather information upon the French revolution, the history of which he had undertaken in connection with Félix Bodin; the first two volumes appeared in 1823, and the work was completed by Thiers alone 4 years later in 10 volumes. This *Histoire de la révolution Française depuis* 1789 *jusqu'au* 18 *Brumaire*, bitterly denounced by the royalists, but highly appreciated by eye-witnesses of the events, won great popularity with the public at large, and has passed through more than 15 editions. On the accession of Prince Polignac to the ministry, Aug. 5, 1829, M. Thiers, dissatisfied with the moderate politics of the *Constitutionnel*, established, in conjunction with his friends Mignet and Armand Carrel, a new political journal, the *National*, which more than any other contributed toward bringing about the revolution of 1830. On the appearance of the royal decrees of July 26, the editors of the *National* were among the first who signed the protest of the Parisian journalists; and Thiers was foremost in proposing and supporting the elevation of the duke of Orleans, first to the regency, Aug. 1, then to the throne, Aug. 9. Three months later he was appointed assistant secretary in the department of finance, first under Baron Louis, then under Laffitte. He had been at the same time elected by the city of Aix to the chamber of deputies, where he was at first laughed at as a speaker; his bombastic style of oratory, connected with his short stature and shrill voice, made him ridiculous, and it was only after altering his style and subduing his tone that his talents as an expounder of the most intricate questions were appreciated. On the fall of Laffitte, March 13, 1831, he resigned his office; but instead of following the example of his patron, who had gone over to the opposition, he sat among the supporters of Casimir Périer, and advocated the peace policy, a hereditary peership, and several other measures that were unpalatable to the people. On the insurrection of June 5 and 6, 1832, he insisted upon the necessity of dealing severely with the republicans and the legitimists. This ingratiated him with the majority of the deputies and the court; and therefore, on the death of Casimir Périer, he became minister of the interior, Oct. 11. He succeeded, by bribing the treacherous Deutz, in arresting the duchess of Berry and suppressing the impending war in Vendée, and advised the expedition against Antwerp, which proved successful. Being transferred to the ministry of commerce and public works, he obtained a grant of 100,000,000 francs from the chamber of deputies, and gave a new impulse to internal improvements; the statue of Napoleon was placed again on the top of the column of Vendôme; the triumphal Arc de l'Étoile, the Madeleine church, and other monuments were completed or erected; canals and railroads were constructed, and under the fostering care of the administration industry revived. In 1834, on the prospect of political troubles, he resumed the ministry of the interior, and evinced personal courage in putting down the insurrectionary movements of April 12 and 13. He resigned Nov. 11; but after a succession of unfortunate ministerial combinations, he resumed his post, with Guizot as his colleague, under the premiership of the duke de Broglie. He had a narrow escape from the murderous attempt of Fieschi, July 28, 1835, and unreservedly advocated the adoption of the so called "laws of September," severely restricting the freedom of the press and the jury. New intrigues occurred in 1836; the whole cabinet sent in their resignation; but Thiers, who had secretly paved his own way, rose to the premiership, holding at the same time the ministry of foreign affairs, Feb. 22. Being however unable to persuade the king to adopt a more liberal policy at home and to show more energy in his transactions abroad, he retired, Aug. 25, and was succeeded by M. Molé. As one of the leaders of the opposition, he adhered in 1838 to the coalition which finally overthrew that minister, and was reinstated in his former position, March 1, 1840. This was the most trying period of his ministerial career; his home policy was impeded by the undecided character of the chamber of deputies; he had to maintain the September laws and retard electoral reform. In his foreign policy he was entirely outwitted by the diplomatists of Russia, England, and Austria, who had agreed to settle the eastern question without consulting France. Enraged at this consummation, and convinced that war only could again raise his country to its proper standing, he was fearlessly preparing for such an emergency, reënforcing the regular army, getting the national guards in readiness, and constructing the fortifications of Paris; but at the last he could not prevail upon the king to resort to such desperate means, and therefore, after 6 months of useless exertions and bitter disappointments, he resigned his powerless premiership, Oct. 29, being succeeded by M. Guizot, and thenceforth was never more recalled to the control of public affairs. He figured as one of the opposition leaders, bitterly censuring the policy of the Guizot cabinet in 1844, denouncing the growing influence of the order of Jesuits in 1845, and insisting upon the necessity of excluding public functionaries from the chamber of deputies in March, 1846. His powers never shone more brilliantly than during the latter part of Louis Philippe's reign; and his vehement speeches against M. Guizot's policy were extensively read and eagerly commented upon, while the articles he contributed to the *Constitutionnel*, in the ownership of which he had now a share, spread far and wide the so called "reformist agitation." But, like so many others, he was taken unawares by the revolution of Feb. 1848. He vainly attempted to retrieve the falling fortunes of the king; he was powerless to check the progress of the republicans; and when their triumph was an established fact, he adhered to the new government. He appeared as a candidate for the constituent assembly, and failed, in the general election, but was on June 4 returned by 4 departments; he sat for that of Seine-Inférieure, voted for placing dictatorial powers in the hands of Gen. Cavaignac, proved himself in his speeches and pamphlets an unmitigated opponent of socialism, was one of the leaders of the so called "order party," and, after evincing little partiality for Louis Bonaparte, finally voted to make him president. A deputy in the legislative assembly and a member of the *club de la rue de Poitiers*, he aimed at overthrowing the republic and bringing about a monarchical restoration; but he and his friends were superseded by the superior cunning of President Bonaparte. On the morning of Dec. 2, 1851, he was arrested at his house, confined to prison for a while, and then transported to Frankfort-on-the-Main. A few months later he was allowed to return, but gave up active politics, and resumed his historical pursuits. As early as 1845 he had published the 1st volume of his *Histoire du consulat et de l'empire*, and had reached the 9th previous to the revolution of February. This work, which gives the fullest account of European affairs from 1800 to 1815, he now hastened, issuing one or two volumes every year; the 20th and last volume is yet to be published. An extraordinary prize of 20,000 francs has been recently awarded to it by the French institute. M. Thiers is a member of the French academy and of the academy of moral and political sciences. Beside his two great historical works, he has published several political pamphlets and an able essay upon *Law et son système de finances* (8vo., Paris, 1826; new ed., 12mo., 1858). He is reported to have in preparation a "History of Florence." His biography has been written by Alexandre Laya: *Études historiques sur la vie privée, politique et littéraire de M. A. Thiers* (2 vols. 8vo., 1846).

THIERSCH, Friedrich Wilhelm, a German scholar, born at Kirscheidungen, June 17, 1784, died in Munich, Feb. 25, 1860. He followed the courses in theology and philology at Leipsic, and studied under Heyne at Göttingen, where he received a degree in 1808, and became a teacher in the gymnasium. He displayed remarkable talent as an instructor, and was called in 1809 to a professorship in the newly established gymnasium at Munich. He and Jacobi were among the first from northern Germany to receive royal appointments at Munich; and during the excitement raised by Christoph von Aretin he published a pamphlet entitled

Unterschied zwischen Nord- und Süddeutschland, which so increased the popular jealousy that an attempt was made to assassinate him. He established in 1812 a philological institute, afterward united with the university, and edited the *Acta Philologorum Monacensium* (3 vols., Munich, 1811-'21). In 1813 he urged the war against France, aided the military organization of the students, and also became an enthusiastic Philhellenist. He visited France and England, was sent as a commissioner from Bavaria to demand the restoration of the objects of art which had been taken from it, met Capo d'Istria at Vienna (1814), and, without sharing in his political designs, sought to found a scientific union for the education of young Greeks. After the triumph of the Hellenic cause he travelled in Greece, and was influential in disposing the country to accept a monarch from Germany. He published on his return a work entitled *De l'état actuel de la Grèce, et des moyens d'arriver à sa restoration* (2 vols., Leipsic, 1833), a eulogy on the modern Greeks. He had previously produced a grammar of the Homeric dialect (3d ed., 1826), an annotated edition of Pindar, containing metrical translations (2 vols., 1820), a treatise on the epochs of sculpture among the Greeks (2d ed., 1829), and a narrative of travel in Italy (1826). From this time he was chiefly occupied in carrying out the educational plans which he had already suggested. Commissioned to investigate the state of the gymnasia of Germany, he published reports (3 vols., 1826-'37), in which he urged adherence to the classical discipline, against the partisans of so called real schools which combined classical with professional or mercantile studies. A long controversy ensued, in which he produced other works in defence and illustration of his system, which was maintained in Bavaria with slight modifications till 1858.—His brother Bernhard (died Sept. 1, 1855) was the author of a work on the age and country of Homer (2d ed., 1832), and a collaborator on Ranke's learned edition of Aristophanes (1830).

THILO, Johann Karl, a German theologian, born at Langensalza, Nov. 28, 1794, died May 12, 1853. He studied theology at the universities of Leipsic and Halle, was appointed in 1817 teacher at the orphan house, and soon after at the *Pædagogium* of Halle, and while in this position assisted Professor Knapp, his father-in-law, in the direction of the theological seminary. In 1820 he made with Gesenius a journey through France and England. In 1822 he was appointed extraordinary, and in 1825 ordinary professor of theology; and in 1833 he was made consistorial councillor. He won a high reputation by his *Codex Apocryphus Novi Testamenti* (vol. i., 1832), which surpassed all previous works on this branch of theological literature in critical acumen and correctness. Beside several other smaller works, he also edited Knapp's *Vorlesungen über die christliche Glaubenslehre* (2 vols., 2d ed., 1836).

THIMBLE (perhaps from thumb and bell), a metal cap for the finger, used in sewing to protect it from the needle. It is said to be of Dutch invention, brought to England about the year 1695 by John Lofting, who set up a workshop at Islington near London, and made thimbles with profit and success in different metals. For the use of men the thimble is commonly made without a top in the form of a wide ring, indented upon its surface with numerous small pits to catch the head of the needle. Those provided with a top are similarly indented upon this portion also. Thimbles are made of thin sheets of different metals, brought into shape by punching disks of the plate into dies. Brass was formerly a common material, which has given place to silver, and of late years gold thimbles or thimbles coated with gold have been largely used. The process of Messrs. Roux and Berthier of Paris is much recommended as making thimbles of great perfection and durability. Thin sheets of sheet iron are cut into disks of about 2 inches diameter, which being heated to redness are struck with a punch into a succession of holes of gradually increasing depth to give them the form of thimbles. The metal is then trimmed, polished, and indented with little holes regularly distributed by means of a double-toothed wheel rolled around its surface. It is next converted into steel by the cementation process, tempered, scoured, brought to a blue color, and lined with a very thin sheet of gold, which is forced in with a polished steel mandrel, which causes it to fasten to the steel as if it were soldered. Gold leaf is then applied to the outside, and is attached by pressure, the edges being secured in a minute groove made to receive them. When made of one metal only, thimbles are more rapidly produced by striking the plate into a succession of conical dies, annealing them with each successive one.

THIMBLEBERRY. See Raspberry.

THIONVILLE, a city of the department of Moselle, France, situated on the Moselle, about 17 m. above Metz; pop. in 1856, 10,500, beside a garrison of 2,000 men. It is connected with Metz by a railroad, and with Luxemburg and other towns by excellent roads. It has a large trade in timber and firewood, coal and coke, grain, and iron. Coal to the amount of 20,000 tons per annum is shipped from the town. About 150,000 quintals of grain and considerable quantities of leather and cut stone are exported. The iron forges and furnaces in the vicinity produce iron to the value of more than $2,400,000 annually. Some of these furnaces have been in operation since the 14th century. They produced good wrought iron by the use of mineral coal in 1823, an earlier date than any other furnaces in France attempted it.

THIRD ESTATE. See Tiers État.

THIRLWALL, Connop, D.D., an English historian and prelate, born at Stepney, Middlesex, in 1797. The son of the rector of Bowers Gifford, Essex, he was educated at Trinity college, Cambridge, was tutor, Craven scholar, Bell's scholar, and senior chancellor's medallist, received the degree of bachelor in 1818 and of master in 1821, and became a fellow. He studied law, and was called to the bar at Lincoln's Inn in 1825, but after 3 years' experience withdrew from the profession, entered the church, and became rector of Kirby-under-Dale, Yorkshire. He joined with J. C. Hare in translating the first two volumes of Niebuhr's "History of Rome" (1828), and contributed to Lardner's "Cabinet Cyclopædia" a history of Greece (1835 *et seq.*), enlarged and improved in a subsequent edition (8 vols., 1845–'52). This work was the basis of a manual by Dr. Schmitz, in the introduction to which he classes it with the later production of Grote as "two English works on the history of Greece such as no other nation can boast of." Another critic says: "It is impossible not to miss in the marble coldness of the bishop of St. David's something of the animating warmth which his predecessor (Mitford) derived from his practical life as an English country gentleman; while, on the other hand, every one recognizes the abundant stores of knowledge and the tact of finished erudition with which the Cambridge scholar was so largely gifted, and which to the Hampshire squire were almost entirely denied." He was for several years examiner for the classical tripos in Trinity college, and examiner in the university of London, and is now visitor of St. David's college, Lampeter. In 1840 he received the degree of D.D., and was created bishop of St. David's. He has published separately a few sermons and charges.

THIRST, the familiar sensation by which the want of fluid in the system is made known, dependent on the condition of the stomach, throat, and fauces, and in a state of health a tolerably faithful indication of the requirements of the body. It becomes, therefore, the stimulus to the mental operations and acts having for their object the gratification of the desire; in infancy these actions are automatic and involuntary. It is generally considered as immediately resulting from an impression on the nerves of the stomach, as it is allayed by the introduction of liquids through a tube, so that the fauces are not touched; in this way speedy relief is obtained from the instantaneous absorption of the fluid by the veins of the stomach. This, however, must be taken with some qualification, as the intensity of thirst bears no necessary relation to the amount of liquid in the stomach, but indicates a want of the system which can be supplied through the blood vessels, the rectum, or the skin; in fact, the conditions are very analogous to those mentioned under HUNGER, both indicating a demand in the system to be supplied through the stomach, which in the case of thirst is indicated locally in the throat and fauces. According to Bostock, it is immediately produced by a deficiency of the mucous secretion of the throat and fauces, ultimately depending on a peculiar condition of these mucous glands. A supply of fluid, as indicated by thirst, is necessary to make up for the losses by cutaneous and pulmonary exhalation, and by the urinary and other secretions, which are effected chiefly at the expense of the water in the blood, requiring a constant supply of new fluid. Water is the natural drink of man and beast, and the purer it is the better it supplies the wants of the system; the morbific influences of a very minute impregnation with lead and other soluble mineral poisons, of a trifling excess of saline ingredients innocuous in small quantities, and of putrescent matters in the water used for daily drink, are well known to physicians and toxicologists. Alcoholic mixtures cannot supply the wants of the blood except by their contained water, and antagonize many of the purposes for which water is required. Thirst is also allayed by tea and coffee, making up in a measure for insufficient food by lessening the waste of the nitrogenized tissues. Thirst is greatest in a dry and hot air, when the perspiration and other secretions are excessive; salted or highly spiced food, strong fermented liquors, and irritating substances and poisons applied to the intestinal mucous membrane, excite thirst, no doubt to induce an ingestion of fluid by which they may be diluted. A sudden loss of blood, either by the lancet or from a wound, or a rapid drain on the vascular system, as in Asiatic cholera, diabetes, and some forms of ascites, causes thirst in proportion to its amount. Thirst is less when the food is watery, and when liquid can be absorbed by the skin from the surrounding air or water. The thirst of fever does not necessarily indicate a pressing demand for fluids, but depends on the dryness and heat of the throat, mouth, and skin, with diminished transpiration, and is better relieved by small pieces of ice than by copious draughts of water. Any water ingested more than thirst demands does not of necessity increase the aqueous constituent of the blood, the superfluous fluid being carried off by the kidneys; and moreover, absorption from the stomach is diminished when the demand is satisfied. Animals with naked skins, like batrachians, living in water or moist air, have no need to drink to quench thirst, cutaneous absorption supplying the necessary fluid; thirst can hardly be felt by the rabbit, Guinea pig, and sheep, judging from the water they consume, on account of the amount of liquids in their fresh vegetable food; carnivorous mammals drink little, and rapacious birds hardly at all, the blood of their victims allaying their thirst; the camel supports thirst for a long time, carrying a supply of fluid in the water stomach; the amount of drink taken by man depends much on habit, and more on the nature of his food, the thirst of vegetarians being generally less than that of meat eaters. The sufferings from thirst in shipwrecked sailors and in travellers in the African and American deserts are familiar to all readers, as also the partial relief by moisture of the air and immersion of the body in salt water; they are more painful to bear than those of hunger, as is shown by the history of besieged garrisons and of persons who have attempted suicide by starvation. One of the most remarkable instances of suffering from thirst was in the case of the French frigate Medusa, lost in 1816 near the coast of Africa; of 150 persons who took refuge on a raft without food or water, 15 only survived after 13 days of intense suffering; while their hunger had become almost nothing on the 9th day, their thirst was inextinguishable, to such a degree that they drank urine; and to render their sufferings more exquisite, during their feverish sleep they dreamed of cooling shade and running brooks, to awake to a tropical sun and a briny ocean. The raging thirst of the victims of the black hole of Calcutta is another familiar instance of similar suffering. In extreme thirst, with dryness and inflammation of the fauces and throat, the perspiration, urine, and fæces are diminished, and finally suppressed; the muscular debility becomes greater and greater, soon followed by delirium, coma, and death. Abstinence from both food and drink is generally fatal in a week; hunger alone may be sustained for 6 or 7 weeks, but thirst alone for a less period. The intense thirst of Asiatic cholera has been relieved by injections of saline matters into the blood.

THISBE. See Pyramus and Thisbe.

THISTED, Waldemar Adolf, a Danish author, known under the assumed name of Emmanuel de Saint-Hermidad, born in Aarhuus, Feb. 28, 1815. He studied theology at Copenhagen, in 1840 founded a school at Skanderborg, which he directed until 1844, and in 1846, after a journey in Germany and Switzerland, became a teacher in the high school of his native place. During 1849–'50 he travelled in Germany and Italy. His travels, novels, and poems embrace some 15 volumes.

THISTLE, the common name of several genera of spiny plants of the natural order *compositæ*. The thistles are distinguished by the peculiarities of their florets, and by the differences in their downy pappus, as well as by the forms of their styles or pistils. The genus *carduus* with the older botanists included all plants with spiny involucres, but as it now stands comprises about 30 species, most of which are natives of Europe. A species known as the musk thistle (*C. nutans*) has spiny leaves and handsome drooping flowers, and is a common plant in dry chalky soils of Europe; toward evening a musky odor arises from the plant. The *C. personata* (cut-leaved thistle) is said to have derived its specific title from its large leaves being used for masks. The milk thistle (*C. Marianus*) has very spiny-margined leaves, beautifully variegated with white stripes or lines; the flowers are of a dull purple. It is frequently cultivated for its singularity and its milky appearance, attributed to the Virgin Mary as she is represented in an ecclesiastical legend.—The thistles of the United States are chiefly different species of *cirsium*, in all about 20, distinguished generically by perfect and similar, rarely subdiœcious flowers, bristly receptacles, regularly or else unequally 5-cleft corolla of a purple, reddish, or else ochroleucous color, oblong, compressed, smooth, not ribbed achenia, and a plumose pappus. The common thistle (*cirsium lanceolatum*, Scopoli) came from Europe, and yet is too abundant by our roadsides and in rich pastures. It has a branching, somewhat hairy stem, very prickly decurrent stem leaves, smooth above, hairy and webbed beneath, and numerous handsome purplish flowers. The tall thistle (*C. discolor*) is very slender, 5 to 6 feet feet high; leaves sessile, pinnatifid, hairy, white and cottony beneath; flowers numerous and small, purple. The pasture thistle (*C. pumilum*, Sprengel) has a short hairy stem, green clasping leaves, oblong lanceolate and pinnated, the segments ciliated and spiny; the flowers few, large, purple, and sweet-scented. The Canada thistle (*C. arvense*, Scop.) is a native of Europe, and in cultivated soils has extended through the United States and overrun the wheat fields of Canada. It is considered the greatest pest in the fields, and can only be subdued by ploughing up and patiently extracting its viviparous subterranean roots. The yellow or horrid thistle (*C. horridulum*, Michaux) is a tall, rough, disagreeable plant, with large, axillary, and terminal flower heads of yellow florets; it grows best very near the sea coast.—The cotton thistle (*onopordon acanthium*, Linn.) has become naturalized in New England, though adventitious from Europe. It is a tall, stout, and very showy plant, with large, decurrent, spiny, and downy whitish leaves, and large, light, purple flowers appearing in July. The blessed thistle belongs to a very extensive genus, and is the *cnicus benedictus* of Linnæus, introducing itself into Louisiana, though native to the Levant.—Many plants bear the name of thistle belonging to quite distinct families. The thistles are regarded as weeds, and are eradicated only by perseverance and industry. Their seeds are eagerly sought for by birds of the sparrow tribes.

THISTLE, Order of the, a Scottish order of knighthood, reputed on very insufficient grounds to be of great antiquity, but which Sir Harris Nicolas is of the opinion had no existence as an organized fraternity previous to 1687, when a warrant for its restitution was issued by James VII. of Scotland and II. of England. It fell into abeyance after the abdication of James, but was restored by Anne in 1703, and is now one of the recognized orders of the British empire. The warrant of 1687 confined the number of knights to 12, beside the sovereign; but since May, 1827, it has been permanently extended to 16. It was formerly customary to admit none but Scottish peers into the order, but the rule is not now strictly observed. The principal decorations are a gold collar, composed of 16 thistles interlaced with sprigs of rue, to which is suspended a small image of St. Andrew and a St. Andrew's cross of silver, in the centre of which is a thistle surrounded by the motto of the order (which is also that of Scotland): *Nemo me impune lacessit*, and from which emanate silver rays forming a star.

THOLUCK, Friedrich August, D.D., a German divine and pulpit orator, born in Breslau, March 30, 1799. Descended from very humble parentage, he first learned a trade, but by the assistance of friends attended the gymnasium of his native city and the university of Berlin. When he left college he delivered a eulogy on Mohammedanism as equal in beauty and merit to the Christian religion; but during his university course he was thoroughly converted from his pantheism and scepticism under the influence of the lectures of Schleiermacher and Neander, and more especially by personal intercourse with Baron von Kottwitz, a member of the Moravian brotherhood. In 1821 he was graduated as licentiate of theology, and began to deliver lectures as *Privatdocent*. In 1824 he was appointed extraordinary professor of oriental literature, in the place of Dr. De Wette, in 1825 made a literary journey to Holland and England, and in 1826 was called to the university of Halle as ordinary professor of theology, in the place of Dr. Knapp. There he has lived and labored ever since, with the exception of a short residence at Rome in 1828–'9, in the capacity of chaplain to the Prussian embassy. He is also university chaplain and consistorial councillor. He had at first to suffer a good deal of persecution from the prevailing rationalism of his colleagues, but succeeded in effecting a radical change, the whole theological faculty of Halle now being decidedly evangelical. Dr. Tholuck is perhaps of all contemporary German divines the most fertile author. His principal works are as follows: "Sin and Redemption, or the True Consecration of the Sceptic" (Berlin, 1825, many times reprinted; translated into English by Ryland, with an introduction by John Pye Smith, republished in Boston, 1856), in opposition to De Wette's "Theodore, or the Consecration of the Sceptic" (1825); *Blüthensammlung aus der morgenländischen Mystik* (1825), a collection of translations from the mystic poets of the East; "Commentary on the Epistle to the Romans" (4th ed., 1842; twice translated into English), the first exegetical fruit of the new evangelical theology; "Commentary on the Gospel of John" (1826; 7th ed., 1857; translated into English by Kaufman, 1836, and by Dr. C. P. Krauth, Philadelphia, 1859), less thorough and permanent, but more popular and better adapted for students, than his other commentaries; "Commentary on the Sermon on the Mount" (1833; 3d ed., 1844; translated into English by R. L. Brown, Edinburgh, 1860), his most learned, elaborate, and valuable exegetical production; "Commentary on the Hebrews" (1836; 3d ed., 1850); "Commentary on the Psalms" (1843; translated into English, Philadelphia, 1859); "The Credibility of the Gospel History" (1837; 2d ed., 1838), a vindication of the Gospels against the mythical theory of Strauss; and "Hours of Christian Devotion" (2 vols., 1840), containing several original hymns. He has published several volumes of sermons since 1829, and two volumes of "Miscellaneous Essays" (1839). He is now (1862) engaged upon a "History of Rationalism." Several small volumes have appeared (1852, '54, and '61) on the preparatory history, in which he gives, mostly from manuscript sources, an account of the condition of Lutheran theology and German university life during the 17th century.

THOM, James, a Scottish sculptor, born in Ayrshire in 1799, died in New York, April 17, 1850. He was brought up to the trade of a stone cutter, and first showed his talent for sculpture by the production of a head of Burns and some portrait busts, which gained him considerable local celebrity. These were followed by his well known group of "Tam O'Shanter," carved out of the common gray stone used for building purposes. Of this group and that of "Old Mortality," which is now deposited in the Laurel Hill cemetery, near Philadelphia, he was employed to make many duplicates, and both works were widely exhibited in Great Britain and the United States. In 1836 he removed to the United States, and settled in Orange co., N. Y.

THOM, William, a Scottish poet, born in Aberdeen in 1799, died in Dundee in March, 1850. He was apprenticed at an early age to a weaver, and throughout life followed that occupation, dying at last in extreme need. He did not attempt composition until near the age of 40, and his earliest strains were extorted by the contemplation of his own poverty and by grief at the death of his wife. Rising soon after into some celebrity, he was brought to London, and complimented by his countrymen with a public dinner. Unfortunately no more substantial testimonial followed this ovation. In 1844 appeared his "Rhymes and Recollections of a Handloom Weaver," which met with but a moderate success.

THOMANDER, Johan Henrik, a Swedish theologian, born in the province of Scania, June 16, 1798. He studied theology at the university of Lund, and was appointed in 1819 teacher at the school of Karlshamm, in 1821 pastor of the same place, in 1827 lecturer on theology at the theological seminary at Lund, in 1833 professor of pastoral theology, and in 1838 member of a committee for drafting a new code of church laws. In 1840 he was elected a representative of the clergy in the Swedish diet, in which he soon distinguished himself as one of the most brilliant speakers of the liberal party. In 1850 he was made provost of the cathedral of Gothenburg, and in

1856 bishop of Lund. He commenced his literary career with translations from Shakespeare, of the "Clouds" of Aristophanes, and of Byron's "Manfred" (Upsal, 1826). His theological works comprise "Hymns of the Ancient Church" (Stockholm, 1828); two collections of sermons (Malmö, 1829, and Lund, 1849); "The New Testament" (Örebro, 1835); and a "Catechism" (Lund, 1838). In connection with Reuterdahl (since 1856 archbishop of Upsal) he edited from 1828 to 1832 a *Theologisk Quartalskrift*, of which in 1836 he became the sole editor. In 1859 he presided over the second Scandinavian church diet at Lund. He is regarded as one of the greatest Scandinavian pulpit orators.

THOMAS, a S. W. county of Georgia, bordering on Florida, and drained by the Ocklockonee river and its head streams; area, 920 sq. m.; pop. in 1860, 10,767, of whom 6,245 were slaves. The surface is level and the soil fertile. The productions in 1850 were 358,920 bushels of Indian corn, 146,022 of sweet potatoes, and 7,667 bales of cotton. There were 16 churches, and 376 pupils attending public schools. Capital, Thomasville.

THOMAS, Antoine Léonard, a French author, born at Clermont-Ferrand, Oct. 1, 1732, died at Oullins, near Lyons, Sept. 17, 1785. He was educated at Paris, and studied law, but early became a professor in the Beauvais college.. In 1759 his poem *Jumonville* attracted some attention; while his *Éloge du maréchal comte de Saxe* won the prize of eloquence at the French academy. The same distinction was awarded to his panegyrics of D'Aguesseau (1760), Duguay-Trouin (1761), Sully (1763), and Descartes (1765); and the prize of poetry to his *Ode sur le temps* (1762). He was elected a member of the academy in 1766, and in 1770 read before it his *Éloge de Marc-Aurèle*, considered his masterpiece, but not published till 1775. His *Essai sur le caractère, les mœurs et l'esprit des femmes dans tous les siècles* (1772) was coldly received, but was translated into several languages. His most important work, at once historical and critical, is his *Essai sur les éloges* (1773). His complete works have been published twice (7 vols. 8vo., Paris, 1802, and 6 vols. 8vo., 1825).

THOMAS, Christians of St. See Christians of St. Thomas.

THOMAS, Frederic William, an American author, born in Providence, R. I., Oct. 25, 1808. At the age of 17 he began the study of law, and after his admission to the bar removed to Cincinnati. He is the author of novels entitled "Clinton Bradshaw" (2 vols. 12mo., Philadelphia, 1835), "East and West" (2 vols. 12mo., Philadelphia, 1836), and "Howard Pinckney" (1840); of "John Randolph of Roanoke, and other Sketches of Character" (12mo., Philadelphia, 1853), &c. He has also published a poem entitled "The Emigrant" (Cincinnati, 1833), and "The Beechen Tree and other Poems" (New York, 1844).

THOMAS, Isaiah, LL.D., an American printer, born in Boston in 1749, died in Worcester, Mass., April 4, 1831. Having served an apprenticeship of 11 years, he commenced business as a printer in Newburyport in 1767. In 1770 he removed to Boston and commenced the publication of the "Massachusetts Spy," in which he attacked with great boldness the oppressive measures of the British government toward the colonies. In 1771 Gov. Hutchinson ordered him to appear before the council in consequence of an article in his paper; he refused to go, and the attorney-general unsuccessfully attempted to obtain a bill of indictment against him from the grand jury; the governor then directed that officer to file an information against him, but such resistance was made to the measure that it was dropped. In 1775 Mr. Thomas took an active part in the skirmish at Lexington, and on May 3 commenced issuing his paper from Worcester, to which town he had removed. In 1788 he opened a bookstore in Boston, under the firm of Thomas and Andrews, and soon after established branches of his publishing business in various parts of the United States, though he continued to make Worcester his residence. In 1791 he printed an edition of the Bible in folio, and subsequently issued numerous editions of smaller size. For many years most of the school books of the country were printed and published by him. In 1810 he published his "History of Printing in America" (2 vols. 8vo.). The American antiquarian society of Worcester was founded through his efforts in 1812, and liberally endowed by him. He received the degree of LL.D. from Alleghany college, Penn., for his services to literature.

THOMAS, Saint, also called Didymus, one of the twelve apostles. Both names, the Hebrew Thomas (Th'om) and the Greek Didymus, denote a twin. Of the history of Thomas very little is known, as he is but rarely mentioned in the Scriptures. When Jesus after his crucifixion appeared to his disciples, Thomas was not present, and he refused to believe the occurrence until he himself saw and touched Jesus. As to the scene of his apostolical labors, the statements of the ecclesiastical writers of the first centuries do not agree; according to some it was Parthia, according to others Egypt and Ethiopia, and according to others India, where the Portuguese in the 15th century asserted that they had found his body. An ancient sect of Christians (Christians of St. Thomas), who in the 8th century were numerous in Persia and still survive in India, claim St. Thomas as their founder; but many theologians consider the account of the labors of St. Thomas in India as having been invented by the Manichæans, and as early as the 5th century the Thomas of India was regarded by Theodoret as a disciple of Manes. To the apostle Thomas an *Evangelium Infantiæ Christi* (also called *Evangelium secundum Thomam*) is ascribed, which pretends to fill up the gaps left by the canonical Gospels in the time from the childhood of Jesus until his public appearance; but it has always been regarded as apocryphal. (See Thilo, *Acta Thomæ Apostoli*, Leipsic, 1823.) St. Thomas is commemorated in the Roman Catholic church on Dec. 21; in the Greek church on the first Sunday of her church year, which begins with Easter (hence called Thomas Sunday). He is often represented in pictures with a square and rule or with a measure, because he would not believe unless after examining for himself, or because, according to a legend, he built a palace for the Indian king Gondohar.

THOMAS À KEMPIS. See Kempis.

THOMAS AQUINAS. See Aquinas.

THOMASIUS (Thomas), Christian, a German philosopher and critic, born in Leipsic, Jan. 12, 1655, died in Halle, Sept. 23, 1728. He was educated by his father, the rector of the celebrated *Thomasschule*, and from 1675 to 1679 studied at Frankfort-on-the-Oder. Returning to Leipsic in 1679, he undertook a course of lectures at the university, and in 1687 he began to lecture in the German instead of the Latin language. In 1688 he published his programme in German, and commenced a monthly sheet, which he edited until 1690, under the title of *Freimüthige, lustige und ernsthafte, jedoch vernunft- und gesetzmässige Gedanken, oder Monatsgespräche über allerhand, vornehmlich aber neue Bücher*, which gave him great influence in Germany. The persecution of his enemies finally forced him to flee from Leipsic. He first went to Berlin, where he was kindly received by Frederic III., elector of Brandenburg, afterward King Frederic I. of Prussia. He subsequently began the delivery of lectures at Halle, and his success induced the elector in 1694 to found the university of Halle. In 1709 he refused an invitation to become professor of jurisprudence in Leipsic, and in 1710 was made rector of the Halle university, and dean of the faculty of jurisprudence. Thomasius exercised a great influence over his times. It was principally by his exertions that trials for witchcraft and torture were abolished in Germany. He wrote a large number of works, among the most important of which were *Geschichte der Weisheit und Thorheit* (8vo., Halle, 1693), and *Vernünftige und christliche, aber nicht scheinheilige Gedanken und Erinnerungen über allerhand, auserlesene, gemischte, philosophische, und juristische Händel* (3 vols., 1723-'6). His life was written by Luden under the title of *Christian Thomasius nach seinen Schicksalen und Schriften* (Berlin, 1805).

THOMASTON, a town and port of Knox co., Me., on St. George river, adjoining the city of Rockland, 15 m. from the coast, and 80 m. E. N. E. from Portland; pop. in 1850, 2,723; in 1860, 3,481. The Maine state prison is situated here, and extensive granite quarries in the neighborhood are worked by convict labor. The inhabitants are chiefly engaged in manufacturing and exporting lime and in ship building. About 300,000 casks of lime are made annually. The registered shipping of the port is now (1862) about 60,000 tons. There are 2 banks with an aggregate capital of $100,000, 2 public libraries, 2 insurance offices, an academy, a society of natural history, an iron foundery, a steam mill, and 5 churches.

THOMISTS. See Aquinas.

THOMPSON, Augustus Charles, D.D., an American clergyman, born in Goshen, Conn., April 30, 1812. He entered Yale college in 1832, but from the failure of his health quitted it before completing his collegiate course. In 1838 he completed his studies at the Congregational theological seminary at East Windsor Hill, Conn., subsequently visited Europe and spent a year at the university of Berlin, and in July, 1842, became pastor of the Eliot Congregational church, Roxbury, Mass., where he still remains. In 1854-'5 he accompanied the Rev. Dr. Anderson as a deputation to the missions of the American board of commissioners for foreign missions in India. He has published the following works: "Songs in the Night" (Boston, 1845; several times reprinted); "The Lambs Fed," which has been translated into the Mahratta language; "The Young Martyrs;" "Last Hours, or Words and Acts of the Dying" (1851); "The Poor Widow, a Memorial of Mrs. Anna F. Waters" (1854; translated into Tamil); "The Better Land, or Believer's Journey and Future Home" (1855); "The Yoke in Youth, a Memorial of H. M. Hill" (1856); "Gathered Lilies, or Little Children in Heaven" (1858); "Feeding the Lambs" (1859); and "Morning Hours in Patmos" (1860).

THOMPSON, Benjamin. See Rumford.

THOMPSON, Daniel Pierce, an American novelist, born in Charlestown, Mass., Oct. 1, 1795. In his childhood his parents emigrated to Berlin, Vt., and he was graduated at Middlebury college in 1820. He afterward taught as private tutor for several years in the vicinity of Alexandria, Va., studying law meanwhile, and was admitted to the bar in Virginia. About 1855 he returned to Vermont and opened a law office in Montpelier, where he still resides (1862), and where he has at different times held the offices of register of probate, clerk of the legislature, compiler of the statutes, judge of probate, clerk of the county and of the supreme court, and secretary of state. His first published work, "May Martin, or the Money Diggers" (1835), gained a prize offered by the "New England Galaxy," and has been many times reprinted in book form. His other works are: "The Green Mountain Boys" (Montpelier, 1840; subsequently republished in Boston); "Locke Amsden," a graphic picture of the New England district school as it was (Boston, 1847); "Lucy Hosmer" (1848); "The Rangers, or the Tory's Daughter" (1850); and "Gant Gurley, or the Trappers of Lake Umbagog" (1857).

THOMPSON, Jacob, an American statesman, born in Caswell co., N. C., May 15, 1810. In his youth he practised law in Mississippi, which state he represented in the lower house of congress from 1839 to 1851, advocating the repudiation by Mississippi of a portion of the state bonds, and opposing the compromise of 1850 as not conceding enough to the South. On the inauguration of President Buchanan (1857) he became secretary of the interior. In Dec. 1860, while still holding that office, he was appointed by the legislature of Mississippi a commissioner in behalf of that state to urge upon North Carolina the adoption of an ordinance of secession; and on Jan. 7 succeeding, he resigned his secretaryship on the ground that the president, by attempting to send reënforcements to the federal troops in Charleston harbor, had violated a distinct understanding entered into with the cabinet. He participated in the subsequent revolutionary movements of the seceded states, and in Nov. 1861 was elected governor of Mississippi, which he still is (May, 1862).

THOMPSON, John R., an American author, born in Richmond, Va., Oct. 23, 1823. He was educated at the university of Virginia, studied law in the office of James A. Seddon, and subsequently in the law school of the university, and in 1845 was admitted to the bar. In 1847 he assumed the editorship of the "Southern Literary Messenger," published at Richmond, Va., retaining that position for many years, and to that periodical made many contributions. Beside these, he has delivered numerous addresses at colleges, and several lectures, and furnished many articles for literary journals in the North and South.

THOMPSON, Joseph Parrish, D.D., an American clergyman, born in Philadelphia, Aug. 7, 1819. He was graduated at Yale college in 1838, studied theology at Andover and New Haven, and was ordained pastor of the Chapel street Congregational church, New Haven, in Nov. 1840. In April, 1845, he removed to New York, having accepted the charge of the Broadway Tabernacle church, which he still retains (1862). While at New Haven, Mr. Thompson was one of the originators of the "New Englander," a Congregational quarterly review, and has contributed nearly 40 articles to it, many of them on denominational topics. He was also one of the founders of the "Independent" newspaper. In 1852 he originated the plan of the Albany Congregationalist convention, which gave a unity and organic life to that denomination which it had not previously possessed. He is also a manager of the American Congregational union, and of the American home missionary society. In 1852 he sailed for Europe and the East, and was absent about two years, exploring Palestine, Mt. Sinai, Egypt, and other oriental countries; and he has since devoted much time to oriental studies, especially Egyptology, the results of which have appeared in his contributions to the "North American Review," the "Bibliotheca Sacra," the "Journal of the American Geographical and Statistical Society," Smith's "Dictionary of Biblical Geography and Antiquities," and the revised edition of Kitto's "Cyclopædia of Biblical Literature." Harvard university conferred upon him the degree of D.D. in 1856. Beside numerous sermons, addresses, and occasional pamphlets, Dr. Thompson has published: "Memoir of Timothy Dwight" (New Haven, 1844); "Lectures to Young Men" (New York, 1846); "Hints to Employers" (1847); "Memoir of David Hale" (1850); "Foster on Missions, with a Preliminary Essay" (1850); "Stray Meditations" (1852; revised ed. entitled "The Believer's Refuge," 1857); "The Invaluable Possession" (1856); "Egypt, Past and Present" (Boston, 1856); "The Early Witnesses" (1857); "Memoir of Rev. David T. Stoddard" (New York, 1858); "The Christian Graces" (1859); and "Love and Penalty" (1860).

THOMPSON, Robert Anchor, an English clergyman and author, born in Durham in 1821. He was educated at Cambridge, and, after being attached for some time to the observatory of Durham, entered holy orders, was appointed curate of Louth, and in 1854 of Binbrooke, Lincolnshire, and is now master of the hospital of St. Mary the Virgin at Newcastle-upon-Tyne. In 1849 he published some astronomical observations at the expense of the university of Durham; in 1853 a volume of sermons; in 1855 "Christian Theism," which took the Burnett prize of £1,800; and in 1857 "Principles of Natural Theology."

THOMPSON, Thomas Perronet, an English author and political reformer, born in Hull in 1783. In 1803 he entered the navy as midshipman, and in 1806 went into the army as second lieutenant. In 1808, through the influence of Wilberforce, he was made governor of Sierra Leone. One of his first acts was to issue a proclamation for the suppression of the slave trade in the colony; and the opposition raised against him by the slave traders caused his recall by Lord Castlereagh, and arriving in England in 1810 he returned to the army, served in the peninsular campaigns of 1813 and 1814, and afterward in the Pindaree campaign in India. In 1819, having learned Arabic, he accompanied Sir William Keir Grant in the expedition up the Persian gulf, and assisted in the negotiation of the treaty with the Arab tribes, by which the slave trade was declared piracy. In 1854 he was made major-general. In 1814 he wrote a work entitled "On a Constitution." He was one of the contributors to the "Westminster Review" on its establishment in 1824, and 5 years afterward became joint proprietor, writing for it constantly until 1836, and treating among other things of free trade, slavery, Catholic and Jewish disabilities, property tax, and other reform questions of the day; his "Corn Law Catechism," which appeared in 1827, was the most effective attack which the protectionist system of commercial policy received. In 1835 he was elected to the house of commons from Hull, was not returned in the general election of 1837, but sat afterward for Bradford in Yorkshire, and was elected again in 1857. A selection from his miscellaneous writings was published in 1842 in 6 volumes.

THOMPSON, Waddy, an American lawyer and statesman, born at Pickensville, Pendleton district, S. C., Sept. 8, 1798. He was graduated at the South Carolina college, studied law, was admitted to the bar in Dec. 1819, and rapidly rose to the head of his profession. In 1826 he was elected to the state legislature, where he continued to serve till his election by the legislature in 1830 as solicitor of the western circuit. When the militia of the state was reorganized, on the nullification excitement, he was elected by the legislature brigadier-general. In 1835 he was elected a representative in congress, and served 3 terms, taking an active part as a whig in all the great debates of that body. When Mr. Calhoun, who lived in his district, went over to the democratic party, all the whig members from the state did the same except Mr. Thompson. This opposition to Mr. Calhoun led to a most exciting canvass at the ensuing election in South Carolina, in which Mr. Calhoun took the stump against Gen. Thompson, who however was reëlected by more than 1,000 majority. As soon as the election was over, Gen. Thompson announced his determination to retire from public life and devote himself to his professional and private pursuits. In 1842 he was appointed minister to Mexico by President Tyler. During the period of his mission, he made two important treaties, and procured the liberation of more than 200 Texan prisoners, many of whom were sent home at his own charge. On his return home he wrote a work entitled "Reminiscences of Mexico," which passed through several editions. Gen. Thompson is an extensive and successful cotton planter in Florida, but resides at his home, near Greenville, S. C.

THOMPSON, William, a British naturalist, born in Belfast, Nov. 2, 1805, died in London in Jan. 1852. He was educated for a commercial life, in 1821 was apprenticed to a linen merchant of Belfast, and in 1832 gave up business and began the study of animals and plants, but especially of birds. To the "Proceedings of the Zoological Society" of London he contributed numerous papers on the natural history of Ireland. In 1840 he prepared for the British association for the advancement of science a "Report on the Fauna of Ireland, Division Vertebrata." In 1841 he accompanied Professor Forbes on a tour to the Grecian archipelago; from 1841 to 1843 contributed frequently to the "Annals of Natural History;" and in 1843 read to the British association, which met at Cork, a further report on the invertebrate fauna of Ireland. Of his great work on the "Natural History of Ireland," the first 3 volumes, devoted to birds, appeared in 1849–'51; but he died before finishing it. In 1856 the 4th volume was published, with a biography of the author, edited by Prof. Dickie.

THOMPSON, Zadoc, an American naturalist, born in Bridgewater, Vt., in 1796, died in Burlington, Vt., Jan. 19, 1856. He was graduated at the university of Vermont in 1823, and in 1824 published the first edition of his "Gazetteer of Vermont." For several years subsequently he was engaged in teaching, and in 1836 he was ordained deacon in the Protestant Episcopal church, but preached only occasionally. In 1842 he published the "Natural, Civil, and Political History of Vermont, and of its various Institutions," followed by a greatly enlarged edition of his "Gazetteer." He was soon afterward appointed professor of natural history and chemistry in the university of Vermont, which office he filled till 1853. He accumulated at Burlington a very complete cabinet of the natural history of the state, which at his death passed into the possession of the university. In 1851 he visited Great Britain as a commissioner from Vermont to the exhibition of the industry of all nations; and a collection of American woods, classified according to their useful properties, which he exhibited, attracted much attention and received the great bronze medal of the exhibition. In 1853 Prof. Thompson was appointed state naturalist, and directed to make a survey of the state, including its physical geography, geology, mineralogy, botany, and general zoology, upon which he was engaged at the time of his death. Beside the works mentioned, he published several school books and small treatises, and in 1853 an appendix to his "Natural History of Vermont."

THOMS, William John, an English antiquary, born in Westminster, Nov. 16, 1803. He was originally placed in the secretary's office at Chelsea hospital, was for some years clerk of printed papers in the house of lords, and in 1862 was appointed sub-librarian of that house. He wrote for various periodicals, but his first separate publication was "A Collection of early Prose Romances" (3 vols., 1828). This was followed by "Lays and Legends of Various Nations" (1834) and "Book of the Court" (1838); he was also editor of "Anecdotes and Traditions" (1839) and "Caxton's Reynard the Fox" (1844). His reputation rests principally on the establishment of the "Notes and Queries," in the editing of which he has been assisted by a large circle of friends.

THOMSON, Anthony Todd, a British physician, born in Edinburgh, Jan. 7, 1778, died at Ealing, Middlesex, July 3, 1849. He was educated at the high school of Edinburgh, studied medicine, attending the lectures of Munro, Black, Gregory, and Dugald Stewart, in 1798 became a member of the speculative society and was intimately associated with Jeffrey, Brougham, Horner, Lord Cockburn, and Lord Lansdowne, in 1799 became a member of the royal medical society, and in 1800 settled in London as a general practitioner. His contributions to medical and botanical science were very extensive and valuable. In 1826 he became a member of the royal college of physicians, and in 1828 professor of materia medica in London university, now University college. In 1832 he was appointed professor of medical jurisprudence, which position he held till his death. His works were extensive and valuable. Of "The London Dispensatory" (8vo., 1811), 10 editions were published during his life, and it was translated into several of the European languages; his "Elements of Materia Medica" (8vo., 1832) was frequently republished in England and America.—Mrs. A. T. Thomson, wife of the preceding, has published "Memoirs of the Court of Henry VIII." (2 vols. 8vo., London, 1826); "Memoirs of Sarah, Duchess of Marlborough, and of the Court of Queen Anne" (2 vols. 8vo., 1839); "Memoirs of the Jacobites of 1715 and 1745" (3 vols. 8vo., 1845); "Memoirs of the Viscountess Sundon," &c. (2 vols. 8vo., 1847); "Recollections of Literary Characters and Celebrated Places" (2 vols. 8vo., 1853); and 9 or 10 novels.

THOMSON, Charles, an American patriot, born in Ireland in Nov. 1729, died in Lower Merion, near Philadelphia, in 1824. He came to America at the age of 11, was educated in Maryland, taught a Friends' academy in Philadelphia, and afterward went into business in that city. From the beginning he was ardently devoted to the cause of the colonies, and in 1774, upon the assembling of the continental congress, was elected its secretary. John Adams speaks of him in his "Diary" at that time as "the Sam. Adams of Philadelphia, the life of the cause of liberty." He remained secretary until the close of the war, and was chosen to inform Washington of his nomination to the presidency. He afterward retired entirely from public life, and occupied his later years in a translation of the Septuagint, which was published in 4 vols. in 1808.

THOMSON, Edward, D.D., an American clergyman, born at Portsea, England, in 1810. He came to America in 1819, attended medical lectures in Philadelphia and Cincinnati, and entered upon the practice of his profession in 1829. In 1832 he entered the ministry of the Methodist Episcopal church, and was stationed successively at Norwalk, Sandusky, Cincinnati, Wooster, and Detroit. In 1838 he was chosen president of the Norwalk seminary, which post he occupied for 5 years, when he was elected professor of mental and moral philosophy in the university of Michigan, and edited the "Ladies' Repository" until called to the position of president of the Ohio Wesleyan university. At the general conference in 1860 he was elected editor of the "Christian Advocate and Journal," New York.

THOMSON, James, a British poet, born in Ednam, Roxburghshire, Scotland, Sept. 11, 1700, died at Kew Lane, near Richmond, Aug. 27, 1748. He was the son of a clergyman, and being destined for the church was sent in his 18th year to the university of Edinburgh, where he passed 6 years, the last 4 of which were devoted to theological studies. In 1724 he left Edinburgh to push his fortunes in London, and for several months discharged the duties of tutor in the family of Lord Binning. Previous to this time he had given indications of poetic talent, and a fragment of blank verse, written at the age of 14 and first published in a life of the poet by Allan Cunningham in 1841, possesses considerable merit as a boyish effusion. He now set about the composition of a more elaborate work, and, encouraged by his college friend Mallet, published in March, 1726, his blank verse poem of "Winter," for the copyright of which he received 3 guineas. It attracted so much attention that a 2d and a 3d edition were called for in the same year. In 1727 appeared "Summer," followed by "Britannia" and a "Poem sacred to the Memory of Sir Isaac Newton;" in 1728 "Spring;" and in 1730 he published "The Seasons," completed by the addition of "Autumn," in a 4to. volume, of which 454 copies were subscribed for at a guinea each. Pope, to whom the author had been introduced by Mallet, took 3 copies. In 1729 he also produced "Sophonisba," a tragedy, acted with moderate success at Drury Lane. In 1731 he visited the continent as travelling tutor of the son of Sir Charles Talbot, afterward lord chancellor, and upon his return to England in the succeeding year commenced an elaborate poem in 5 parts upon "Liberty," which appeared in 1735–'6. He regarded it as the best of his productions, but, as Dr. Johnson has observed, "Liberty called in vain upon her votaries to read her praises and reward her encomiast; none of Thomson's performances were so little regarded." It was abridged by Lord Lyttelton in collecting the author's works for publication, and in that condition it still appears. He had meanwhile been placed in easy circumstances by the appointment of secretary of briefs in the court of chancery, bestowed upon him by Lord Talbot; but upon the death of the chancellor in 1737, his successor, Lord Hardwicke, after waiting for some time for Thomson to make a formal application for the place, bestowed it upon another. He was however soon after introduced to the prince of Wales, then emulous of the reputation of a patron of literature, and received from him a pension of £100 a year. He now resumed his dramatic labors, and produced his "Agamemnon" (1738), which, in spite of the presence of Pope and the acting of Quin, both warm friends of the poet, narrowly escaped being damned on the first night of the performance. It was followed by "Edward and Eleanora," the representation of which on the stage was prohibited under the operation of the act for licensing dramatic performances; by the masque of "Alfred," written in conjunction with Mallet, and which contains the celebrated song and chorus, "Rule Britannia," set to music by Dr. Arne; and by "Tancred and Sigismunda," performed with success at Drury Lane in 1745. About this time he was raised to comparative opulence by his appointment, through the influence of Lyttelton, to the office of surveyor-general of the Leeward islands, the duties of which were discharged by a deputy, while the clear emoluments amounted to £300 a year; and the latter part of his life was passed in ease and tranquillity at an elegant retreat at Kew Lane. In 1748 appeared the "Castle of Indolence," a poem in the Spenserian stanza, on which he had labored for many years, and which is esteemed the most finished and poetical of his larger works. He died soon after of a fever resulting from exposure in the night air. His posthumous play of "Coriolanus" was subsequently performed at Covent Garden, and the profits, after the discharge of his debts, were remitted to his sisters.—Thomson was a man of gross appearance and exceedingly indolent disposition, and was unwavering in his attachment to his friends. Lord Lyttelton has pronounced the best eulogy upon him in his prologue to "Coriolanus," in which it is said that his works contained "no line which, dying, he could wish to blot." The "Seasons" have preserved their popularity to the present time, and are frequently republished.

THOMSON, Thomas, a British chemist, born in Crieff, Perthshire, April 12, 1773, died July 2, 1852. He was educated at the university of St. Andrew's and at Edinburgh, and in 1796 became connected with the "Encyclopædia Britannica," and the chemical articles furnished by him to that work were the basis of his "System of Chemistry" (4 vols. 8vo., 1802). He began to lecture on chemistry at Edinburgh in 1800, was the first to suggest the use of chemical symbols, and was one of the first to elucidate the atomic theory of Dalton. In 1810 he published the "Elements of Chemistry" (8vo.); in 1812, the "History of the Royal Society of London" (4to.); and in 1813, "Travels in Sweden," which country he had visited in the previous year. In 1813 he went to London and commenced the "Annals of Philosophy," which he continued to edit until 1822. In 1817 he was chosen lecturer at the university of Glasgow, and in 1818 was made professor of chemistry, which position he held until his death. In 1825 he published "An Attempt to Establish the First Principles of Chemistry by Experiment" (2 vols.), which was followed by "The History of Chemistry" (2 vols., 1830–'31), "Outlines of Mineralogy and Geology" (2 vols., 1836), and "Brewing and Distillation" (1849).—His son, of the same name, is a distinguished botanist, now superintendent of the East India company's botanic gardens at Calcutta, and has published an account of his travels in Thibet.

THOR, in Scandinavian mythology, the first born of Odin and Frigga, the bravest and boldest of all the gods. He directed the winds and the seasons, and was the Jupiter of the Scandinavians. In the Eddas he appears as the champion of gods and men, destroying monsters and giants with his bolts of thunder. A terrible club or hammer was hurled at his victim, and the blow having been dealt, the weapon returned to his hand. His waist was bound with a girdle which for ever renewed the strength he spent in battle. Thursday is named for him.

THORAX, the anatomical name of the bony framework formed by the breast bone, ribs, and spine, which contains and protects the lungs, heart, and great vessels, and including a cavity separated from the abdomen by the diaphragm; the cavity is lined by serous membrane, and its movements are the chief agents in the process of respiration; a thorax as thus defined exists in its perfect form only in mammalia. The movements of the thorax (see Respiration) are rendered more easy and extensive by the cartilages which connect the ribs in front with the sternum. The bony thorax protects not only the lungs and heart, but extends down so as to cover the liver, spleen, kidneys, stomach, duodenum, and part of the colon. Covered with the muscles and with the upper extremities attached, it forms a cone with the apex downward; in the skeleton the apex is upward; the back and shoulders may be very broad without indicating a wide and capacious thorax, the diameter of the lower part of the neck corresponding better with that of the apex of the thorax; Freeman, the American giant, measured 26 inches from tip to tip of the shoulders, but only 6 inches across the lower part of his neck. The human thorax is flattened antero-posteriorly, while that of the lower mammals is flattened from side to side. In the fœtus the thoracic is much smaller than the abdominal cavity, from the inactivity of the lungs; at birth it suddenly enlarges, increases perceptibly to puberty, and even grows larger in adult age to its full development; as age advances it tends to collapse and the bony framework to become a rigid cage from ossification of the costal cartilages, the apex comes forward, and the round back of the old man appears. The thorax may be distorted by curvature of the spine from disease, occupation, improper attitudes, and neglect of physical education, especially in female youth; it may also be deformed by pleurisy, emphysema, phthisis, and various articles of dress, particularly corsets; these last act chiefly on the 5th to the 10th ribs, pressing them forward and inward, their longer cartilages allowing them to yield readily, carrying with them out of place the organs of the chest and abdomen. At the Hôtel Dieu at Paris a girl of 18 lately presented herself to M. Breschet, with a soft, elastic tumor in the neck, extending from the collar bone to Adam's apple (thyroid cartilage), which proved to be a portion of the lungs forced out of the chest into the neck by the compression of corsets. The old-fashioned busk of steel, whalebone, or wood caused much deformity of the chest, by inward depression of the breast bone. Instead of 8 or 9 inches, the antero-posterior diameter of the thorax in a tightly laced woman is not unfrequently reduced to 3 or 2. The so called pigeon or chicken breast, in which the ribs are drawn in and the breast bone protruded, is frequently if not generally caused by obstruction to respiration from enlarged tonsils or other disease in the air passages. The thoracic cavity corresponds with the volume of the heart and lungs, but there is no necessary relation between the volume of the latter and the vigor of the constitution, nor between the size of the cavity and the amount of respired air or the volume of the abdominal cavity; it is generally true, however, that a large abdominal cavity is found with a small thorax. Taking the most perfectly formed male chests, both from living persons and the classic statues of ancient athletes, it is found that, between the heights of 5 and 6 feet, for every inch of stature there is an increase of ⅛ to ⅝ of an inch in the circumference of the thorax, whether the weight be taken at the minimum, average, or maximum at the respective heights; the circumference varies from 30 to 37 inches at 5 feet, and from 35⅛ to 44⅛ at 6 feet. The internal diameter bears no relation to the height or weight of the individual, but the vital capacity or the measure of the mobility of the thorax does in a very exact ratio.

THORBECKE, Johannes Rudolph, a Dutch statesman and publicist, born in Zwolle in 1796. He studied at the university of Leyden and various German universities, and in 1825 was made professor of political sciences in the university of Ghent, and in 1830 in that of Leyden. In 1840 he was elected to the legislative body, and in 1844, with 7 other delegates, proposed to the king a revision of the constitution, which the latter rejected as too liberal; but in March, 1848, he was placed at the head of a commission for revising the constitution, which adopted the plan proposed in 1844. In Oct. 1849, he was called to form a ministry composed of members of the constitutional progressive party, in which he took charge of the department of the interior and effected several important reforms. In April, 1853, he was compelled to resign, and resumed his functions in the university of Leyden; but at the commencement of 1862 he again became prime minister. He is the author of several legal and political works.

THOREAU, Henry David, an American author, born in Boston, Mass., July 12, 1817, died in Concord, May 6, 1862. He was graduated at Harvard college in 1837, and was subsequently engaged in teaching school and in trade, and was also a contributor to the "Dial." In 1849 he published "A Week on the Concord and Merrimack Rivers," and in 1854 "Walden, or Life in the Woods," in which he describes a hermit life of more than two years in a forest near Concord, beginning in March, 1845.

THORILD, Thomas, a Swedish author, born in Kongelf, in the læn of Gothenburg, in 1759, died in Greifswalde, Oct. 31, 1819. While a tutor at the university of Upsal, he submitted to the states of the realm a plan for an act for the freedom of the press, but was not permitted to print it; and in consequence of an attempt to have it published, he was banished for 4 years. He went first to Copenhagen, where he published a treatise "On the Natural Greatness of the Female Sex;" in 1795 he went to Altona, and subsequently became librarian and professor of the Swedish language and literature in the university of Greifswalde. As a metaphysician he is known by his work entitled *Maximum, sive Archimetria* (Berlin, 1799). There is a collection of his poems and other writings edited by Geijer (3 vols., Upsal, 1819–'25).

THORKELIN, Grim Jonsson, an Icelandic scholar, born in Iceland in 1752, died in Copenhagen in 1829. His reputation was first established by his editions of the Icelandic ecclesiastical laws entitled *Jus Ecclesiasticum Vetus seu Thorlaco-Ketillianum*, and *Jus Ecclesiasticum Novum Arnæanum*. In 1786 he undertook an antiquarian journey through England, Ireland, and Scotland, and published "Fragments of English and Irish History in the 9th and 10th Centuries" (London, 1788), and *Mores de Ælfrico Commentarius* (London, 1789). His great work was his collection for Danish-Norwegian history entitled *Diplomatarium Arno-Magnæanum* (2 vols., Copenhagen, 1786). Beside these, he superintended an edition of the *Eyrbyggia-Saga* (1787), of the Anglo-Saxon poem of Beowulf with a Latin translation (1815), and of the law book of Magnus Lagabæter entitled *Gula-things Laug* (1817).

THORLACIUS, Skule Thordsen, a northern antiquary, born in Iceland in 1741, died in Copenhagen in 1815. He was one of the first cultivators of the old northern literature, and at the time of his death was rector of the Latin school. He had a principal part in the editing of the third volume of the *Heimskringla* of Snorro Sturleson (Copenhagen, 1783), and wrote various important essays on northern antiquities.—Börge, son of the preceding, born in Colburg, May 1, 1775, died in Copenhagen, Oct. 8, 1829, was at the time of his death professor of eloquence in the Copenhagen university. He followed in his father's footsteps in the investigation of the northern language and literature, furnished the means for the publication of the second part of the Sæmundic Edda, and wrote various works on cognate subjects.

THORLAKSSON, Jon, an Icelandic poet, born in Selardal, near Arnarfjord, Dec. 13, 1744, died in Bœgisa, Oct. 21, 1819. He was educated for the priesthood, but in 1772 was dismissed from it for an alleged crime, and was not restored until 1780, having in the mean time supported himself as corrector of the press. About 1788 he was presented with the living of Bœgisa in the north of Iceland, the value of which was nearly $35 a year, but was reduced by the necessity of employing a curate. Here he made a version into Icelandic of "Paradise Lost" from the Danish, the first 3 books of which were published by the Icelandic literary society; but that association failing for want of funds, the work was left in manuscript, and was not printed until 1828 at Copenhagen. Thorlaksson wrote numerous other poems, but his fame rests on this version. Shortly before his death he received a pension of $30 a year from the king of Denmark. His collected poems fill about 1,100 pages in the *Islenzk Ljódabok Jons Thorlakssonar Prests ad Bægisa* (2 vols., Copenhagen, 1842–'3).

THORN (*cratægus*, Linn.), the common name of spiny shrubs or bushes, having conspicuous foliage, showy flowers, and beautiful fruits. Several different species are to be found throughout all the northern portions of the globe. The most common thorn of Europe and of England is the sharp-thorned hawthorn (*C. oxycantha*, Linn.), which has deeply lobed and somewhat shining leaves, small, fragrant flowers, and small, shining haws or fruits, and is esteemed among the best hedge plants of Great Britain. There are several distinct varieties, much prized as ornamental shrubs. When planted in rich soils they attain a considerable height, and are handsome and graceful, especially if spared the pruning knife. The double white, the scarlet-flowered, and the double scarlet-flowered are indeed exquisitely beautiful, tree-like plants. Loudon gives 30 varieties, all of which are remarkable, and cultivated by amateurs. The Glastonbury thorn (*C. o. præcox*) leaves out as early as January or February, and has been known to flower at Christmas, giving rise to a legend of its having sprung from the staff of Joseph of Arimathæa. The common or sharp-thorned hawthorn of Europe was well known to the Greeks of ancient times as the *pyracantha*, although it is doubtful whether they or the Romans employed it in any useful way. It has fallen into disrepute in the United States as a hedge plant, being liable to the attack of insects, and in midsummer despoiled of the beauty of its foliage by the red spider.—What are termed oriental thorns are very similar in having deeply cut leaves, but so covered with hairs as to cause them to assume a dull gray or hoary aspect; their flowers however are large and fragrant, and their fruits likewise large and succulent. In expression and shape they are described by writers as less elegant than the hawthorns, being formal and rounded; but the fragrance of blossom and the size and beauty of fruit compensate in a great degree. The sweet-scented (*C. odoratissima*, Bot. Reg.) with its red, the tansy-leaved (*C. tanacetifolia*) with its yellow, the eastern (*C. orientalis*) with its purple, and the *C. aronia* with its light orange-colored fruits, are all highly recommended. To this group of thorns belongs the azarole, with globose, scarlet haws, found wild in small woods and rough places in the south of France and in Italy. Its flowers are borne in corymbs toward the extremities of the branches; they are middle-sized, and are succeeded by round, somewhat oval fruits, which vary exceedingly in dimensions in different plants raised from seed; they are most generally of a yellowish red color. The ripened haws are mealy and somewhat acid; and in Italy and the Levant they are sometimes used as table fruits. Six distinct and permanent varieties are known in France: the hairy-leaved, the white Italian azarole, the double-flowered, the long whitish-yellow fruited, the yellowish-white fruited, and the deep-red fruited.—The American thorns have less deeply cut leaves and smaller fruits than these last, and sharp spines or thorns. The cockspur thorn (*C. crus-galli*, Linn.) has deep green shining leaves and very strong and long spines, and this with its varieties has been usefully employed for hedges. The Washington thorn (*C. cordata*, Aiton) has a stem from 15 to 20 feet high, furnished with numerous, slender, dark purple branches armed with sharp slender spines, which are about 2 inches in length; it is a native of Virginia, according to Darlington, and has been recommended for making hedges. The white thorn or scarlet-fruited thorn (*C. coccinea*) has a stem of about 12 feet in height, and rugged spreading branches, which are armed with short spines, the color of the fruit giving to it the specific name. This species grows in some situations to the stature of small trees, and affords food for numerous kinds of birds. The black or pear thorn (*C. tomentosa*, Linn.) has several varieties, supposed by some to be distinct species; it is a tall shrub or low tree, usually with large, globular or pear-shaped, crimson or orange red, eatable berries or haws. According to Torrey and Gray, the number of American species is 17, of which several are to be found in the extreme southern states. There is scarcely any other hardy shrub affording so much interest to ornamental planting, or which would attract so many kinds of valuable and useful birds.

THORN APPLE. See Datura.

THORNBACK. See Ray.

THORNHILL, Sir James, an English painter, born in Weymouth in 1676, died in the vicinity of that town, May 4, 1734. He was descended from an ancient family of Derbyshire, and was compelled by the extravagance of his father to take up painting as a profession. Having settled in London, where he received liberal assistance from his maternal uncle, the celebrated Dr. Sydenham, he soon rose into considerable reputation, and during the last 30 years of his life was employed on the most important works of art undertaken in Great Britain. Among these were the 8 pictures in chiaroscuro illustrating the history of St. Paul on the inner dome of St. Paul's cathedral, London, and the decorations at Kensington palace, Blenheim, and Greenwich hospital, none of which have much to recommend them beside their vastness, although the composition is not inferior to that of contemporary works of the class. He also executed two sets of copies of the cartoons of Raphael at Hampton Court, one of which is now in the possession of the royal academy. In 1724 he opened an academy for drawing at his house in Covent Garden, where Hogarth, who afterward effected a stolen union with his daughter, received his first and only regular instructions in art. Thornhill was knighted by George I.

THORNTON, Bonnell, an English author, born in London in 1724, died May 9, 1768. He was educated at Oxford, and began the study of medicine, but quitted it for literature, and in conjunction with George Colman the elder began a series of periodical essays, called "The Connoisseur," which lasted from Jan. 4, 1754, to Sept. 30, 1756. With Colman also he was one of the original proprietors of "The St. James's Chronicle." In 1762 he published "An Ode on St. Cecilia's Day, adapted to the antient British Music, viz., the Salt-box, the Jews-harp, the Marrow-bones and Cleavers, the Hum-strum or Hurdy-gurdy, &c., with an Introduction giving an Account of those truly British Instruments" (4to., London); the ode was set to music by Dr. Burney, and performed on the instruments named with great success. In conjunction with Colman and Richard Warner he published "The Comedies of Plautus, translated into familiar Blank Verse" (2 vols., 1767), of which he translated "Amphitryon," "The Braggart Captain," "The Treasure," "The Miser," and "The Shipwreck." In 1768 he published "The Battle of the Wigs, an additional Canto to Dr. Garth's Poem of the Dispensary" (4to.).

THORNWELL, James Henry, D.D., an American clergyman, born in Marlborough district, S. C., in 1811. He was graduated at the South Carolina college in 1829, and soon after commenced the study of law, which he abandoned for theology, and commenced preaching as a Presbyterian minister to the Waxhaw church. In 1836 he was elected professor of logic and belles-lettres in the South Carolina college, but after two years resigned to become pastor of the Presbyterian church in Columbia, S. C. In 1840 he accepted the professorship of the evidences of Christianity and the chaplaincy of the college, which he held till May, 1852, when he took charge of the Glebe street church, Charleston. In December of the same year he was elected president of the college, and in 1856 resigned to take a professorship in the Presbyterian theological seminary at Columbia, where he still remains. Dr. Thornwell has published, beside numerous sermons and occasional pamphlets, essays, addresses, &c., "Arguments of Romanists Discussed and Refuted" (New York, 1845), and "Discourses on Truth" (New York, 1854). In the secession movement of 1860–'61 he wrote with zeal and ability in advocacy of the southern policy.

THOROUGH BASE, the art by which harmony is superadded to any proposed base. The term is also used like counterpoint as synonymous with the science of harmony. (See Music, and Harmony.)

THOROUGHWORT. See Boneset.

THORPE, Benjamin, an English philologist, born about 1808. He devoted himself to the study of Anglo-Saxon, and translated the Anglo-Saxon grammar of Rask in opposition to Kemble, who followed the system of Grimm. He superintended a series of good editions of Anglo-Saxon works, of which the first was the metrical paraphrase of the Bible by Caedmon, with a translation and notes, which appeared in 1832. He has published *Analecta Anglo-Saxonica* (1834), a selection of extracts from Anglo-Saxon literature with a vocabulary attached; "The Anglo-Saxon Version of the Story of Apollonius" (1834); *Libri Psalmorum Versio Antiqua Latina, cum Paraphrasi Anglo-Saxonica* (1835); the great collection entitled "Ancient Laws and Institutes of England, with a Compendious Glossary," &c. (1840); *Codex Exoniensis* (1842); "Northern Mythology" (3 vols., 1853), a critical collection of the legends of Scandinavia and northern Germany; and "The Anglo-Saxon Chronicle" (2 vols. 8vo., 1861). He receives from government a pension of £150.

THORPE, Thomas Bangs, an American author and artist, born in Westfield, Mass., March 1, 1815. He is the son of a clergyman, and passed his earlier years chiefly in the city of New York. At the age of 16 he painted a picture illustrative of Irving's "Bold Dragoon," which was exhibited at the American academy of fine arts, and was purchased by a member of the Irving family. After spending 3 years at the Wesleyan university, Middletown, Conn., he settled in 1836 in Louisiana, where he became connected with the press, but still found time to paint a few pictures, among which is a full-length portrait of Gen. Zachary Taylor, now in the representatives' hall of the capitol of Louisiana. Under the title of "Tom Owen the Bee-Hunter," he published a series of sketches of western and southern life, among the most prominent of which is his "Big Bar of Arkansas." During the Mexican war he was a bearer of despatches to Gen. Taylor, under whom he saw much of military life; and after the fall of Matamoras he published a volume entitled "Our Army on the Rio Grande" (12mo., Philadelphia, 1847), which was followed by "Our Army at Monterey" (12mo., 1848). He returned to New York in 1853, where he published a new collection of his sketches entitled "The Hive of the Bee-Hunter," and became a frequent contributor to "Harper's New Monthly Magazine." In 1860 he exhibited his large picture of "Niagara as It Is," in which for the first time the three falls were represented at one view on canvas; and he now (1862) divides his time equally between the pen and pencil.

THORWALDSEN, Albert Bertel, a Danish sculptor, born near Copenhagen, Nov. 19, 1770, died there, March 25, 1844. He was the son of Gottskalk Thorwaldsen, a native of Iceland, and by profession a carver in wood, and at the age of 11 was admitted as a pupil in the free school of the academy of arts in Copenhagen. In a year or two he was enabled to improve upon his father's carvings; at 17 he gained the silver medal of the academy; at 20 the small gold medal for a composition representing Heliodorus driven from the temple; and in 1793 the grand prize, which secured him a royal pension for a term of years, to enable him to study abroad. Various circumstances prevented his departure from Denmark until 1796, and for several years subsequent to his arrival in Rome, where he had determined to pursue his studies, his progress, owing in part to the troubled character of the times, in part to his own diffidence and distrust of his powers, received no adequate recognition. Depressed by his ill fortune, he was preparing in 1803 to return to Denmark, when his model of Jason bearing the golden fleece attracted the notice of Thomas Hope, who immediately offered him a liberal sum to complete the work in marble. From this time commissions poured rapidly in upon him, and in a few years he rose to the head of his profession in Europe, Canova being the only sculptor who disputed his preëminence. His earliest efforts reflected the severe idealism of the classic marbles which had been the chief objects of his study and admiration in Rome, and his Mars, Mercury, Ganymede, the Graces, Venus, Cupid and Psyche, Hector and Priam, the "Dance of the Muses on Mount Helicon," and other subjects of the pseudo-classical school, are among the most successful modern imitations of the antique. A larger and more important work than any of these was the magnificent bass-relief, 60 feet in length, representing the "Triumphal Entry of Alexander into Babylon," the plaster cast of which was completed in 1812 at the command of Napoleon, as a decoration for one of the large apartments of the Quirinal palace. Two copies in marble are in existence, one of which is now in the palace of Christiansborg, Copenhagen. As Thorwaldsen gained in confidence and executive power, however, he rose above the mere imitation of Greek sculpture, and found in works of an earnest, religious character and contemporary interest the true sphere for the exercise of his genius. In 1819 he yielded to the entreaties of his countrymen, who had endeavored in vain to prevail upon him to settle among them, and made a brief visit to Copenhagen. His progress thither through Italy and Germany was one continuous ovation, and upon arriving at his native city he was received with acclamations by a vast multitude, who escorted him in triumph to the apartments prepared for him in the royal palace of Charlottenborg. Returning to Rome in 1820, he commenced the great series of religious works which stamp him as one of the regenerators of sculpture. Preëminent among these was his celebrated colossal group of "Christ and the Twelve Apostles," which now stands in the cathedral church of Copenhagen. The figure of Christ may challenge comparison with any statue of ancient or contemporaneous art for dignity, simplicity, and deep feeling, and the whole work is justly considered the sculptor's masterpiece. In the same church are his statues of the four great prophets and a number of exquisite bass-reliefs, and the exterior is adorned by his frieze of "Christ bearing the Cross," and by a numerous group in alto-rilievo representing the "Preaching of St. John," which fills the pediment. He also executed equestrian statues of Maximilian Frederic of Bavaria and Prince Poniatowski, a fine seated statue of Galileo, one of Copernicus in Warsaw, and one of Byron, now in Cambridge; a monument to Pius VII., numerous illustrations in bass-relief of abstract qualities and passages in sacred history, and a vast number of busts and miscellaneous works. His largest single work is the colossal lion near Lucerne in Switzerland, which commemorates the fidelity of the Swiss guards who fell in defending the Tuileries, Aug. 10, 1792; and among his statues in bronze are those of Schiller at Stuttgart and of Gutenberg at Mentz. In 1838 he returned to Denmark in a frigate placed by the government at his disposal, and was again received by the entire population of Copenhagen, from the king downward, with an affectionate ovation, and lodged in the royal palace. He made a brief visit to Rome in 1841 for the benefit of his health, and died suddenly, two years after his return to Copenhagen, of disease of the heart, just after he had taken his seat at the theatre. His remains, after lying in state for several days at the academy, were interred with extraordinary honors in the presence of an immense concourse of people. He was engaged until within a few hours of his death upon a statue of Luther, which was left unfinished. He was a man of much modesty, generosity, and amiability, and in his old age presented a truly patriarchal appearance with his white locks falling in masses over his shoulders. "His face," says his countryman Holberg, "had the plastic characteristics of one of his own admirable statues; when he moved in the midst of a crowd, it would separate as if it felt the presence of a superior being." Thorwaldsen has often been compared with his great contemporary Canova, whom he excelled in force of expression, in largeness of style, and in the power of his imagination, if inferior to him in the refinements of execution, and in the softness and beauty of his female forms; the difference of aim between the two being as marked as that which distinguished the sculptors of the Phidian era and of that in which Praxiteles flourished. As a sculptor of bass-relief the Danish artist surpassed any of his contemporaries; and some of his smaller works in this department, as the "Day" and "Night," now in the possession of the duke of Devonshire, and which were modelled in 1815 at a single sitting, display a fertile vein of poetic imagination and executive refinement. In other works of the class he neglected the execution for the purpose of attaining vigor and strength of character. His entire collection of works of art, and the bulk of his large personal property, were bequeathed to the city of Copenhagen for the purpose of establishing and supporting the celebrated museum which bears his name, and which is one of the most famous depositories of art treasures in Europe. It contains copies in marble or plaster of all his works, and is destined to receive those left by him in an unfinished state, and toward the completion of which the Danish government contributes an annual appropriation.

THOU, Jacques Auguste de (Lat. *Thuanus*), a French historian, born in Paris, Oct. 8, 1553, died May 7, 1617. He was the 3d son of Christophe de Thou, first president of the parliament of Paris, and was destined for the church, but soon turned to the study of law, and was a pupil of Cujas and Hottman. In 1573 he accompanied Paul de Foix, the French ambassador, to Italy, where he continued his studies, and began to write a general history of his own time. On his return home, he was sent on a mission to the Netherlands; received the appointment of councillor in the parliament when scarcely 23 years old; and in 1581 was sent as a commissary to Guienne to administer justice. There he became acquainted with the prince of Condé, the young king of Navarre (afterward Henry IV. of France), and the celebrated philosopher Montaigne. Being recalled to Paris, he was made master of requests, and afterward *président à mortier* of the parliament of Paris, by Henry III., whom he served with zeal as commissary in Normandy and Picardy, presided over that part of the parliament which, upon the king's order, adjourned to Tours, and was one of the deputies to the states-general at Blois in 1589. Associated with Schomberg, he aided in bringing about a reconciliation between Henry III. and Henry of Navarre, and went to Germany and Italy to procure aid for them in men and money. Finding Henry IV. on the throne at his return, he adhered faithfully to him, was appointed by him grand master of the royal library, was one of the framers of the edict of Nantes, and supported the rights of the Gallican church by preventing the adoption in France of several decrees of the council of Trent. Although a Catholic by education and profession, he assisted in several of the meetings between the heads of his own church and those of the Protestants; accepted in 1601 the title of temporal father and patron of the Franciscans; and, notwithstanding all these extraneous offices, fulfilled his magisterial duties with the utmost punctuality, while he found leisure to prepare his great history. On the death of Henry IV. he was, in conjunction with Châteauneuf and Jeannin, appointed one of the directors of finance, but was refused by the queen regent the office of first president of the parliament, which had been promised him by the late king. This disappointment preyed upon his mind, and embittered his later years. He published in 1604 the first 18 books of his *Historia sui Temporis*, which rapidly passed through 5 editions. He prepared a more complete one, which began to appear in 1616, and was not completed till after his death. Père Dupuy and Nicolas Rigault, improving the materials he had left, issued in 1620 the 7th edition, which consisted of 138 books, and embraced a period of 64 years, from 1543 to 1607. The best edition of his historical works is that of S. Buckley and T. Carte (7 vols. fol., London, 1733), which, beside the *Historiarum sui Temporis Libri CXXXVIII.*, contains his autobiography, letters, and various essays, with an appendix by Rigault bringing down the history to the death of Henry IV. This history, which is deservedly classed among the masterpieces of the kind, is written in exceedingly chaste Latin. It has been translated into French. De Thou also left some Latin poems: *Hieracosophion, sive de Re Accipitraria Libri III.* (4to., 1584); *Poemata Sacra* (12mo., 1599); and *Posteritati, Poematium, Opus*, &c. (12mo., 1678).—His son, François Auguste, who succeeded him as grand master of the royal library, and was afterward named councillor of state, was a friend of Cinq-Mars, and died on the scaffold, Sept. 12, 1642, with that unfortunate favorite of Louis XIII.

THOUARS. See Du Petit-Thouars.

THOUVENEL, Édouard Antoine, a French statesman, born in Verdun, Nov. 11, 1818. He studied law, made a journey in the East, and published *La Hongrie et la Valachie, souvenirs de voyage et notes historiques* (1840). He then entered the bureau of foreign affairs in the ministry of Guizot, and in 1845 went to Brussels as attaché. In 1845 he was sent to Athens as secretary of legation, and after the recall of the ambassador was, in Jan. 1849, raised by Gen. Cavaignac to the dignity of minister with full powers, and acted as such during the negotiations of 1850 in regard to Don Pacifico. In Dec. 1851, he was called to the direction of political affairs in the foreign office, and remained in this position until 1855, when he was sent as ambassador to Constantinople. On May 8, 1859, he was made senator; and upon the disagreement between the emperor and Count Walewski in regard to the Italian policy, Thouvenel succeeded that minister, Jan. 5, 1860, in the department of foreign affairs. In this position he conducted in 1860 the diplomatic negotiations with England in regard to the Syrian expedition, and in regard to matters in Italy with Count Cavour, who ironically said of him: "This Thouvenel writes excellent despatches, true works of art. He makes a trade of diplomacy, as we do of politics." He still holds the station of minister of foreign affairs.

THRACE, in ancient geography, originally the name of that part of modern Turkey in Europe lying between the Danube, the Black sea, the sea of Marmora, the Grecian archipelago, the Struma, and a line, not well defined, connecting that river with the Danube. In later times, however, that part of Thrace which lay between the rivers Strymon (now Struma) and Nestus (Karasu) was annexed to Macedonia by Philip, the father of Alexander, and the country N. of the Hæmus (Balkan) was made by the Romans a separate province under the name of Mœsia. Thrace, in the narrowest sense of the word, was bounded N. by the Hæmus, E. by the Euxine (Black sea), S. E. and S. by the Thracian Bosporus (strait of Constantinople), the Propontis (sea of Marmora), the Hellespont (strait of Dardanelles), and the Ægean sea (archipelago), and W. by the Nestus. Two offshoots of the Hæmus, the Rhodope (Despoto Dagh), E. of the Nestus, and a parallel range near the Euxine, traversed it in a S. E. direction. It was watered, beside the Nestus, by the Hebrus (Maritza), its affluents the Artiscus (Tundja), Agrianes (Erkeneh), and others, and the Melas. The principal towns were Apollonia and Salmydessus on the Euxine; Byzantium (Constantinople) on the Bosporus; Selymbria and Perinthus or Heraclea (Erekli) on the Propontis; Callipolis (Gallipoli) and Sestos on the Hellespont, in the Thracian Chersonesus (peninsula of Gallipoli); Lysimachia, Ænos (Eno), Mesembria, Maronea, and Abdera, on the Ægæan; and Philippopolis (Filibeh), Hadrianopolis (Adrianople), and Trajanopolis, on the Hebrus. The towns on the sea coast were all Greek settlements. The district between the Strymon and Nestus, called Macedonia Adjecta, contained Neapolis, Philippi, and Amphipolis. In the times of Herodotus and Thucydides, Thrace, in the wider sense, was peopled by numerous tribes, probably of the Gothic branch of the Indo-European family. Among these were the Getæ, Treres, Odrysæ, Triballi, Daci, and Mœsi. They are described as powerful, warlike, and cruel. They purchased their wives and sold their children to exporting traders, tattooed their bodies, lived on booty and plunder, and were renowned as hard drinkers. They worshipped deities identified with Mars, Bacchus, and Diana, and had an oracle of Bacchus on a lofty summit of Rhodope. The tribes near the southern coast were more civilized, owing to the influence of the Greek settlers. At an early period, however, some of the Thracian tribes appear to have attained to a higher degree of culture than even the Greeks, their neighbors. Thus Orpheus, Linus, Musæus, and Eumolpus are said to have been Thracians, beside whom Thamyris and Zamolxis may be mentioned. We find fragments of the Thracian race also in parts of Asia Minor and central Greece.—The Thracians are said to have been conquered by Sesostris of Egypt, and subsequently by the Teucrians and Mysians. They were subdued by the Persians under Darius, but recovered their freedom after the reverses of Xerxes. Their most powerful native rulers were Sitalces, king of the Odrysæ, who fell in a battle against the Triballi in 423 B. C., and his nephew Seuthes, after whose death the Thracian kingdom was split up in parts. Philip of Macedon conquered the greater part of it, and after the death of Alexander it was ruled by Lysimachus. It was subsequently annexed to Macedonia, and finally, with the latter, to the Roman dominions, though long continuing to be governed by native chiefs. After the division of the Roman empire it shared the fate of the eastern part.

THRALE. See Piozzi.

THRASHER. See Thrush.

THRASYBULUS. I. An Asiatic Greek, tyrant of Miletus, who lived about the middle of the 6th century B. C. During his reign Sadyattes and Alyattes, kings of Lydia, waged war for 11 years against Miletus. Alyattes, in setting fire to the crops of the Milesians, had destroyed a temple of Minerva at Assesus, and immediately afterward fell sick; and the Delphic oracle, when consulted upon his illness, refused to give a response until the temple should be restored. Alyattes therefore sent a herald to Miletus to ask for a truce while rebuilding the temple. Thrasybulus agreed to the truce, and, though in distress for provisions, made before the herald the greatest ostentation of plenty. This stratagem produced its desired effect, and Alyattes, who had expected to hear that the Milesians were reduced to the last extremity, hastily concluded a peace. For his celebrated advice to Periander, see Periander. II. An Athenian, attached to the democratic party, and a friend of Alcibiades, died in 389 B. C. In 411 he was in command of an Athenian galley in the fleet at Samos, and joined the opponents of the oligarchical government of the 400, exacting an oath from the Athenians in the fleet to maintain the democracy. He was soon after made a general by an assembly in the camp, and procured the pardon and recall of Alcibiades. At the battle of Cynossema he commanded the right wing, and secured the victory by a sudden attack upon the Peloponnesians. In 407, with a fleet of 80 ships, he reduced most of the revolted cities on the coast of Thrace to submission, and about the same time was with Alcibiades elected one of the new generals. Banished on the establishment of the thirty tyrants, he seized with the aid of some Thebans the fortress of Phyle, and with 1,000 men occupied Piræus. After the accession of the ten he was defeated by Lysander and Libys, but, together with all who had joined him, was saved from punishment by the contrivance of Pausanias. In 395 he led an army to the assistance of the Thebans, then menaced by Sparta, and in 390 was sent with 40 ships to aid the Rhodians against Teleutias, restored the Athenian interest in Byzantium, secured several new alliances, and reduced Methymna and other towns in Lesbos. Afterward sailing south, he anchored in the Eurymedon, near Aspendus in Pamphylia, when the inhabitants, exasperated by some act of his soldiers, fell upon him in the night and killed him. III. Tyrant of Syracuse, brother of Gelon and of Hiero I., the latter of whom he succeeded upon the throne in 467 B. C., supplanting his nephew, the rightful heir. In order to protect himself against his own people, whom he had exasperated by his cruelty and injustice, he gathered a large force of mercenaries, occupied two quarters of the city, Achradina and Ortygia, and harassed the citizens by frequent sallies. They at length assembled a large force, defeated him, and compelled him to leave Syracuse; and after a reign of only one year he retired in 466 to Locri in southern Italy, where he died, being the last of his dynasty.

THRASYMENUS, or Trasimenus, Lake. See Hannibal, and Perugia.

THREAD. See Cotton Manufacture, and Linen.

THREAD WORM. See Entozoa, vol. vii. p. 227.

THREATENING LETTERS, sent to persons for the purpose of extorting money, have been said to constitute a misdeameanor or criminal offence at common law. Blackstone says that threatening by letter (even without demand) to kill any of the king's subjects or to fire their houses, &c., was made high treason by a statute of Henry VIII. But the law of England on this subject is determined by more recent statutes. By 9th George I. and 27th George II. this offence was made felony, punishable by death; but, by 10th and 11th Victoria, ch. 66, the punishment was changed to transportation beyond the seas for life or any term not less than 7 years, or imprisonment not less than 4 years, and, if a male, public or private whipping. In many of the United States there are statutory provisions, punishing with great severity an attempt to extort money by means of a threatening letter. Generally, one who makes such a threat may be held to bail, or compelled to give security to keep the peace and be of good behavior. There have been several cases under these statutes, but they have usually turned upon questions of fact depending on the peculiar circumstances of the case, and not on questions of law. It may be said, however, that a threat, to be indictable, must be such as might naturally overcome a man of ordinary firmness and sagacity; and the money demanded under the threat must be money to which the sender of the letter has no right. In England, it would seem to be an offence at law to post up, on a placard or otherwise, a threatening notice; and it has even been held that a request to another to post up such a notice is indictable. The offence of sending a threatening letter is in law committed in the county to which it is sent, and the sender may be indicted in that county.

THRESHER. See Shark.

THRESHING MACHINE, a machine for threshing and separating grain from the straw. The threshing floor of the ancients was a flat surface of ground covered with clay rolled smooth and hard. Sheaves of grain were spread evenly on this floor, and cattle driven over it until the grain was beaten out by the constant tramping upon it. The Egyptians usually muzzled the ox while threshing, and the Greeks are said by Ælian to have had the filthy practice of besmearing the mouths of animals with dung to prevent their eating the grain. The flail, which is yet in common use by small farmers, is supposed to have been the first mechanical device for threshing. It is a very ancient invention, and the exact period of its origin is not known. Planks or timbers stuck over with pieces of flint or hard wooden pegs were used to some extent, but answered no good purpose. Michael Manzes, an East Lothian gentleman, is supposed to have been the first inventor of a machine for threshing, which was merely an adaptation of suitable mechanism to drive a large number of flails by water power. Though unsuccessful in practice, this machine attracted considerable attention, and in 1758 a Stirlingshire farmer named Leckie invented a rotary machine which consisted of a set of cross arms attached to a horizontal shaft, and the whole enclosed in a cylindrical case. It proved tolerably efficient in threshing oats, but was not adapted to wheat, as it knocked off the entire head from the straw without separating the kernels. Mr. Leckie having demonstrated the superiority of a rotary motion for this purpose, it was an easy matter to remedy the defects of his machine and perfect the invention. In 1786 Andrew Meikle, a Scotchman, made an improvement on Leckie's machine by substituting a drum or cylinder with projections on its surface formed by sticking in short pins, or otherwise. He also applied rollers, connected by suitable mechanism to the driving gear, for feeding in the straw. When operated, the drum was set in rapid motion by water or other power; the sheaves of grain, unbound and placed between the rollers, were fed in; and the projections, revolving with great velocity on the periphery of the drum, beat out the grain from the heads and partially separated it from the straw. A patent was procured in Great Britain in 1788, when Mr. Meikle constructed the first working machine, and added many new improvements, among which was the attachment of a fan mill, by which means the grain was separated and cleaned from both straw and chaff. Though an invention of vast importance, saving annually millions of dollars in manual labor, and immensely increasing the product of grain throughout the civilized world, the simplicity of the threshing machine and the perfection of Meikle's inventions left little room for great modern improvements. The most prominent American inventor connected with this machine is Mr. Pitts, who considerably improved the method of separating the grain and straw after being threshed. His patent has long since expired, and his improvement is very generally in use. Threshing machines are constructed of various sizes, from one to ten horse power inclusive. The duty of a good two horse power machine is said to be 300 bushels of oats or 100 bushels of wheat per day of 10 hours. The larger machines usually have the fan mill attached, delivering the grain perfectly clean and ready for the market; but the smaller only thresh the grain from the straw, requiring the separate operation of the fan mill to clean it from the chaff.

THRIFT (*armeria vulgaris*, Willd.), a pretty herbaceous plant, with linear smoothish leaves, somewhat triangular at base and clustered around the short stem close to the ground. The pale purple flowers in heads, proceeding from a scaly membranaceous involucre, are supported on dwarf scapes. There are two or more distinct varieties, one with broader leaves and taller flower scapes, and another with red flowers, which is more attractive when in blossom. The thrift is a native of the Alps of continental Europe, and of the most northern parts of Canada. It was early introduced into the British flower gardens for making edgings and borders. It is found to prefer a soil in which a little peat is mixed.

THROCKMORTON, a new N. W. co. of Texas, drained by the Brazos river and its affluents; area, about 500 sq. m.; pop. in 1860, 124, none of whom were slaves. The surface is undulating and the soil highly fertile. There is an abundance of fine timber and ample supply of water for manufacturing purposes. The Comanche Indians still occupy a portion of the county. Capital, Camp Cooper.

THROCMORTON, Sir Nicholas, an English statesman, born in London about 1513, died there, Feb. 12, 1571. His ancestors had filled high offices in the state for centuries. He was page to the duke of Richmond till 1536, was afterward sewer to Henry VIII., and headed a troop at the siege of Boulogne. Distinguished in the Scottish campaign under Somerset, he was soon after knighted, received valuable manors and appointments, and sat in parliament as member for Northampton. He was present at the death of Edward VI. in 1553, and, though a Protestant and aware of the movement in favor of Lady Jane Grey, favored the accession of Mary. Arrested in the following year as an accomplice in Sir Thomas Wyatt's rebellion, he conducted his own defence, disputed every point with the counsel and the bench, and was acquitted by the jury. It is certain that he was privy to if not implicated in the rebellion, and the judges remanded him to the tower on the ground that the verdict was contrary to law; and the jurors were called before the star chamber, where four expressed contrition and the others were fined and imprisoned. An elaborate and copious report remains of this trial. He was released in 1555, went to France till 1556, and privately visited the princess Elizabeth at Hatfield, after whose accession he received successively the offices of chief butler of England and of chamberlain of the exchequer. As ambassador to France from 1559 to 1563, he favored the policy of Cecil, and intrigued to foment the civil religious war; was sent to Scotland in 1565 to remonstrate with Mary against her marriage with Darnley; was imprisoned in 1569 for having favored a marriage between Mary and the duke of Norfolk; and though soon released, never regained Elizabeth's confidence.

THRUSH, the common name of a very large family of dentirostral birds, which contains some of the finest songsters in various parts of the world. The bill is of moderate length, rather stout, slightly convex and keeled above, with sharp and notched tip; at the base of the upper mandible on each side of the gape is a row of bristles of much less size than in the fly-catchers; nostrils at the base of bill, partly protected by a membranous scale; wings tolerably long, broad, usually rounded at the end, with the 1st quill very small; legs rather short and stout; tarsi compressed, covered in front by a single scale in the typical genus *turdus* (Linn.); tail moderate. The food consists of insects, worms, berries, and fruits, and sometimes mollusks; they move on the ground by hopping on both feet at once. The family of *turdidæ* or thrushes is divided by Gray into the sub-families *formicarinæ* or ant thrushes, with rather long legs, living principally on ants, and found in the tropics of both hemispheres; *timalinæ* or babblers, with a more curved bill, and tarsi long and strong, so named from the chattering made by their flocks, inhabiting the old world; *oriolinæ* or orioles, from the old world (see Oriole); *pycnonotinæ* or bulbuls, with a short and much curved bill, also from the old world; and *turdinæ* or true thrushes, which alone can be noticed here. Two species of the genus *mimus* (Boie), placed by Cabanis in the family *liotrichidæ*, have been described under Cat Bird and Mocking Bird.—There are more than 100 species of the genus *turdus* described, having the characters given above; they are found in all parts of the world, and are more or less migratory and shy; some frequent forests, others the thickets of field and meadow, and others rocky districts; the nest is made of coarse grasses and mosses, usually lined with mud and soft plants, and is placed on bushes or trees; the eggs are 5 or 6 in number; the flesh is delicate and good eating. Several species have been already noticed under Blackbird, Fieldfare, and Robin. Among the American species may be mentioned the wood thrush (*T. mustelinus*, Gmel.), 8 inches long and 13½ in alar extent; the form is stout, the tail nearly even, and the 3d and 4th quills the longest; the general color is rufous brown above, brightest on the head, and olivaceous on the tail; pure white below, with numerous blackish spots on breast and sides; legs yellow, bill brown, yellowish at base. It is found in the eastern United States to the Missouri river, and south to Guatemala. This was Audubon's greatest favorite, as its sweet notes enlivened him in the solitary and dense forest at early dawn after an uncomfortable and stormy night; the notes are few, but powerful, clear, and mellow, rising and falling in gentle cadences; they are especially pleasing at sunset, when several of these charming songsters seem to challenge each other to sing their best; the food consists of berries and small fruits, and insects; the flight is elevated. The eggs are uniform light blue; the young are easily raised from the egg, and they sing well in captivity; the flesh is very delicate and juicy.—The hermit or solitary thrush (*T. Pallasii*, Cab.) is 7¼ inches long and 11½ in alar extent; it is yellowish olive above, rufous on the tail and rump; below white, with black spots on breast; tibiæ and sides yellowish olive brown. It is found in eastern North America to the Mississippi river; it is a constant resident in the southern states, preferring the darkest, most swampy, and most secluded canebrakes along the Mississippi; its flight is short, low, and gliding; its song is only a single soft and plaintive note; the nest is built lower on the trees than that of the wood thrush, not so firmly saddled on the branches, and smaller; the eggs are light blue, with dark dots at the larger end; it raises 2 broods in the south; it feeds on berries and fruits. Wilson's or the tawny thrush (*T. fuscescens*, Steph.) is 7½ inches long and 11¾ in alar extent; uniform yellowish red above; throat and upper neck yellowish, with very indistinct spots on the latter; rest of lower parts whitish. It is found in eastern North America to the Missouri, and north to the fur countries; its song is similar to that of the wood thrush, but less powerful and with more trills and variations; it prefers dark woods and moist places, feeding on beetles and berries, passing most of the time on the ground, where it hops with great agility; the eggs are pale greenish blue; only one brood is raised in a season. The olive-backed thrush (*T. Swainsonii*, Cab.) is 7 inches long and about 12 in alar extent; dull greenish olive above; the sides of the head, breast, and throat tinged with reddish yellow, with a ring of the same around the eyes; breast with very distinct dark brown spots, and rest of lower parts white. It is found over eastern North America to the Black hills, north to Greenland, south to Mexico and Peru, and is accidental in Europe and Siberia. Several other species are found on the Pacific side of the continent.—Of the European species, the largest is the missel thrush (*T. viscivorus*, Linn.), 11 inches long; it is light grayish brown above, the fore part of the head grayish and the rump shaded with ochrey yellow; secondary coverts and tail feathers tipped with grayish white; a cream-colored band from bill over eyes; below yellowish white, each feather tipped with a black spot, largest and transversely oblong on breast, smaller and triangular on neck. It frequents woods and copses, in small straggling flocks, and is shy and vigilant; it feeds chiefly on berries, especially those of the mistletoe (whence its common name), in this way remarkably assisting in the diffusion of this plant. The song of the male resembles that of the blackbird, and is heard as early as February, before the appearance of the leaves, and even during storms, whence its name of storm cock; it is very bold in the spring, driving away other birds from the neighborhood of its nest. The eggs are 4 or 5, 1¼ by ⅞ of an inch, flesh-colored with irregular scattered spots of brownish red; 2 broods are generally raised in a season; it has been seen to carry off small birds to its nest to feed its young, like the shrike and jay; the flesh is good. The song thrush, throstle, or mavis (*T. musicus*, Linn.) is 9 inches long, yellowish brown above, tinged with red on the head; secondary coverts tipped with reddish yellow; fore part of neck and breast yellowish, each feather terminated by a triangular brownish black spot; lower wing coverts reddish yellow. It frequents lightly wooded regions and gardens, in the latter doing good service by destroying snails, obtaining the animal by breaking the shell against a stone; it is one of the finest of European songsters, singing from early spring to autumn, in the morning and evening, from the top of a bush or tree; Macgillivray highly praises its melody. It was one of the birds used by Roman epicures in their extravagant dishes of the brains and tongues of singing birds; it is sometimes seen now in the markets, and its flesh, especially in the beginning of winter when the food consists of snails and worms, is very fat and juicy. Several other fine singers of the genus are found in various parts of the old world.—There are two birds generally called thrushes in the United States, which deserve mention here; one is the brown thrush or thrasher, placed by Cabanis and Baird in the family *liotrichidæ*, sub-family *miminæ* (with the cat and mocking bird), and genus *methriopterus* (Reich.). This bird (*M. rufus*, Reich., or *T. rufus*, Linn.) is 11¼ inches long and 13 in alar extent; brownish red above; below pale rufous white, thickly streaked with dark brown, and tinged anteriorly with reddish; 2 white bands on the wings; inner surface of wings and inner edge of primaries cinnamon; tail rufous. It is found over eastern North America to the Missouri, and perhaps to the high central plains; it is a constant resident in the southern states, and is almost as numerous as the robin; it migrates by day, singly, with a low and heavy flight. The song is prolonged, loud, varied, and melodious, surpassed, in the opinion of Audubon, only by that of the mocking bird. The eggs are 4 to 6, dull pale buff, with numerous brown dots; 2 broods are raised annually in the southern states; it breeds well in aviaries, and the young are raised like mocking birds, singing well and very active in confinement. It is a bold and powerful bird, chasing cats, dogs, and foxes, not afraid of hawks and snakes, and savagely fighting with its rivals in breeding time; it will attack and kill small birds in the same cage with it; both sexes incubate, and bravely defend their nest and young; the food consists of insects, berries, and fruits of all kinds. The water thrush (*sciurus Noveboracensis*, Nutt.; *T. aquaticus*, Wils.)

is placed by the most recent ornithologists in the family *sylvicolidæ* or warblers; it is 6¼ inches long and 9¾ in alar extent; olive brown above with a green shade; beneath pale sulphur yellow, brightest on the abdomen; the other parts thickly streaked with olivaceous brown, and blackish on the breast. It is found throughout the eastern United States to the Missouri and south to Central America, and perhaps to Brazil. This, as also the Louisiana water thrush, considered by some as a distinct species and by others as a mere variety, is an exquisite songster; it is rather shy, wading in and about water in search of insects; the eggs are flesh-colored, with dark red spots on the larger end; the flesh is very fat and juicy in the southern states in winter.

THUANUS. See Thou, Jacques Auguste de.

THUCYDIDES, a Greek historian, born in Athens about 471 B. C., died about 400. He was the son of Olorus, and was probably connected with the family of the great Miltiades and Cimon, and is said to have been connected also with that of Pisistratus; but the few facts that are known with any certainty of his life are derived from his own writings. The story that at the age of 15 he heard Herodotus read his history at the Olympic games, and was affected to tears, is at least doubtful, as is also the statement that he studied the art of rhetoric under Antiphon. He tells us that he owned gold mines in that part of Thrace opposite Thasos, from which in after times Philip of Macedon obtained the treasure used in the subjugation of Greece. In 424 B. C., the 8th year of the Peloponnesian war, he was the commander of an Athenian squadron of 7 ships, and charged with the general authority on the coast of Thrace. The Spartan general Brasidas was anxious to get possession of the important city of Amphipolis, defended by Eucles, the colleague of Thucydides; and fearful that the Athenian admiral, from his property and his influence in Thrace, would be enabled to rouse that country against him in defence of the city, he offered to the garrison the most favorable terms of capitulation. Thucydides, who had been stationed at Thasos, as soon as he received the message set sail with his whole force, and reached Eion, 3 m. from Amphipolis, that same evening. The city he found had already surrendered, but he succeeded in repelling an assault made by Brasidas against Eion both by land and water. The capture of Amphipolis was a great blow both to the prosperity and pride of Athens, and the two generals charged with the defence of the city were obliged to undergo punishment, either for their ill success or for their neglect of duty. Thucydides was condemned to exile, on the proposition of Cleon. Modern historians almost universally represent the accused man as innocent, and as suffering from the consequences of a misfortune, not of a fault; but Grote defends the conduct of the Athenians on the ground that the general had been charged with the defence of the Thracian coast, and especially of Amphipolis, and was culpably wrong in not having taken care to be near enough the city to render it efficient and immediate aid in case of attack. Thucydides passed 20 years in exile, spending much of the time in Thrace; but he must also have visited various other parts of Greece, and it is certain from his own writings that he frequently visited the states under Lacedæmonian rule. He returned to Athens about the time the city was freed by Thrasybulus. The accounts of the time and manner of his death are uncertain, but among the ancient writers there seems to have been a general impression that he died violently. According to Pausanias, he was assassinated after his return; according to Plutarch, he was said to have been killed in Thrace, though his remains were carried to his native city.—The work by which Thucydides is known is the history of the Peloponnesian war, for which he carefully collected the materials during its progress. It is divided into 8 books, the first of which is introductory to the history. Thucydides was not only the greatest historian of Greece, but he created a kind of historical writing in which he has never been surpassed and rarely rivalled. The great struggle between the republics of Athens and Sparta for the hegemony of Greece is the leading idea of his work, in which the interest of all events centres. Every thing which illustrates this idea is carefully related, no matter how unimportant in itself; every thing which does not bear upon the great contest, no matter how important, is passed over entirely or thrown dimly into the background. The accuracy and truthfulness of the history, and the care and skill with which the conflicting evidence has been sifted, have never been attacked. It is in narration, in the vivid description of events, that Thucydides is especially conspicuous. "He was," says Macaulay, "a perfect master of the art of gradual diminution. His history is sometimes as concise as a chronological chart; yet it is always perspicuous. It is sometimes as minute as one of Lovelace's letters; yet it is never prolix. He never fails to contract it and to expand it in the right place." Although evidently a man who recognized the importance of religious influences, he was never the slave of the superstitions of his times; and with a quiet irony he remarks that of all the prophecies uttered at the commencement of the war, that one only came true which declared that it would last thrice 9 years.—The first edition of Thucydides was published by Aldus at Venice in 1502. Of the numerous succeeding editions, the best are those of J. Bekker (3 vols., Berlin, 1821), Haack (2 vols. 8vo., Leipsic, 1820), Poppo (10 vols. 8vo., Leipsic, 1821–'38), and Arnold (3 vols. 8vo., Oxford, 1830–'35). There have been English versions by Nicolls (London, 1550), by Hobbes, by W. Smith (1753), by Bloomfield (1829), and by Dale (1856).

THUGS (Hindostanee, *Thugna*, to deceive), a sect of assassins in India, now nearly exterminated by the British government. Their atrocious practices were not followed so much for the sake of plunder, or for the gratification of a malicious nature, as from religious motives. They were the worshippers of the goddess Kali, the divinity who presided over impure loves, sensual indulgences, and death. One of the sacred books of the Hindoos, of the second grade, the *Kalika Purana*, describes their practices with the utmost accuracy. The members of the sect belong to all the different castes, and each has its functions to perform. The gangs were from 80 to 300 in number, and they were divided into various classes under a *junadar* or *sirdar*, their leader, and a *guru* or teacher. The classes were the spies, who were learners; *bhuttotes*, stranglers; *sothas*, entrappers, who were sometimes women; and *lughaees* or grave diggers. They usually assumed the dress of merchants or pilgrims, and often craved the protection of those whom they intended to destroy. Their usual instrument of destruction was the handkerchief or *rumal*, with which by a dexterous movement they strangled their victims. The spies having informed them of the particulars relative to the route, habits, and circumstances of their intended victims, the members of the gang travelled in such lines as to be near each other, and the entrappers by artful management attracted them to a spot remote from dwellings, where the stranglers executed their office; and having stripped them of whatever they possessed, the grave diggers buried them, with such precautions as generally to prevent discovery. The plunder received was divided, one third to the widows and orphans of the sect, one third to the goddess Kali, and the remainder to the partners in the assassination. After a murder the Thugs who had committed it united in a sort of sacrament called *tapounee*, eating consecrated sugar. Their deities were carefully consulted before going on their expeditions, and unless the omens were favorable the Thug would not go. Neither women nor old men were victims. Europeans were never killed, because there would be more danger of detection. There were also bands of Mohammedan Thugs, of the sect of Mooltanees, and it is possible that at the first the system of *thuggee*, as they term it, originated with Mohammedan banditti, though it afterward became more a Hindoo than a Mohammedan practice, and the words used are of Sanscrit origin. They were found in all parts of India. In the Deccan they were called *phansigars* or noosers. Hyder Ali and Tippoo Sultan both attempted to exterminate them, and the English government sought to suppress them as early as 1810; but it was not till the administration of Lord William Bentinck (1827–'35), who appointed Capt. Sleeman to this service, that their gangs were successfully broken up. Between 1826 and 1835, 1,562 persons were condemned as Thugs, their families put under surveillance, and their children educated to virtuous habits and taught trades by which they might obtain an honest livelihood. In 1836 the government published, for judicial purposes, a work called "Ramaseeana, or a Vocabulary of the peculiar Language used by the Thugs," written by Capt. (now Col.) Sleeman. Full accounts of this tribe of assassins are to be found in Thévenot's travels, in "The Confessions of a Thug," by Capt. Meadows, and in vol. xiii. of "Asiatic Researches."

THULE, the name given by the ancient navigator Pytheas, who flourished about the time of Alexander the Great, to an island in the northern ocean, which he discovered after a voyage of 6 days in a northerly direction from the Orcades (Orkney islands). Modern geographers have differed in opinion as to the precise locality of the island, and it has been doubted whether any definite country is alluded to. The ancients generally applied the name to the most northern part of the habitable world, whence the phrase *ultima Thule*. Iceland, which has been frequently designated as the island discovered by Pytheas, seems too remote from the continent to have been visited by so early a navigator, and the more general opinion inclines to Mainland, the largest of the Shetland group. Some consider Norway the *ultima Thule;* and others, among whom is Malte-Brun, make it identical with Jutland.

THÜMMEL, Moritz August von, a German writer, born near Leipsic, May 27, 1738, died Oct. 26, 1817. He studied at the university of Leipsic, where he became intimately acquainted with Gellert, Weisse, Rabener, and Kleist. In 1761 he received an appointment in the service of the hereditary prince Ernest Frederic of Saxe-Coburg, who on his accession to the throne made him aulic councillor and in 1768 minister. In 1783 he resigned his office, and spent the remainder of his life partly at Sönneborn near Gotha, and partly in travelling. His principal works are: *Wilhelmine* (1764), a comical epic; *Inoculation der Liebe*, a poetical narrative (1771); and *Reise in die mittägigen Provinzen von Frankreich* (10 vols., Leipsic, 1791–1805), a novel containing many reminiscences of his own travels. A posthumous work by him, *Der heilige Kilian, oder das Liebespaar*, was published by Hempel in 1819. The first collective edition of his works was published by Thümmel himself (6 vols., Leipsic, 1812 *et seq.*); the last and most complete one in 1844, in 8 vols. A life of Thümmel was published by Gruner (Leipsic, 1819).

THUNBERG, Carl Peter, a Swedish naturalist, born in Jönköping, Nov. 11, 1743, died Aug. 8, 1828. At the university of Upsal he became a pupil of Linnæus; and in 1771, a year after graduating, he accepted the situation of surgeon in one of the Dutch East India company's vessels, with the intention of undertaking a botanical survey of Japan. For the purpose of learning the Dutch language, he passed three winters at the Cape of Good Hope; and between 1773 and 1779 he resided principally in Java and Japan. Returning to

Sweden in 1779, he was appointed in 1784 professor in the chair of botany formerly occupied by Linnæus, which he retained until the close of his life. The results of his observations in Africa and Asia were given to the world in a series of elaborate works, of which the first, entitled *Flora Japonica*, &c. (8vo., Leipsic, 1784), contained a description of Japanese plants, including many new ones. In 1788–'91 appeared a general account of his travels under the title of *Resa uti Europa, Africa, Asia, forattad åren* 1770–'79 (4 vols. 8vo., Upsal), which was within a few years republished in German, English, and French. His remaining works comprise *Prodromus Plantarum Capensium* (Upsal, 1794–1800); *Icones Plantarum Japonicarum* (Upsal, 1794–1805); *Flora Capensis* (Upsal, 1807–'18); and an immense number of memoirs on subjects suggested by his researches in Africa and Asia, which were published in all the principal scientific journals of Europe. He was, beside, the author of nearly 100 academical dissertations published at Upsal between 1789 and 1813. At the time of his death he was an honorary member of 66 learned bodies.

THUNDER. See Lightning.

THURGAU, or Thurgovia, a canton in the N. E. of Switzerland, bounded N. and N. E. by the Rhine and the lake of Constance, separating it from Schaffhausen, Baden, Würtemberg, and Bavaria, S. E. and S. by the canton of St. Gall, and W. by Zürich; area, 384 sq. m.; pop. in 1860, 90,347. The surface is comparatively level, but numerous hills traverse the country in different directions, the height of which nowhere exceeds 1,000 feet above the level of the lake of Constance. The drainage belongs to the basin of the Rhine, toward which it flows by the Thur and its tributaries, and also by the lake of Constance, including the Untersee. The climate in the S. W. is severe, but in the other parts of the canton it is temperate. The soil is not very productive. Fruit is extensively grown, and the vine is cultivated in many places and produces wine of good quality. About ⅓ of the surface is covered with forest. Some linen and cotton goods, ribbons, lace, hosiery, and canvas are manufactured. There is an extensive trade, greatly facilitated by the Rhine and Lake Constance. About ¾ of the inhabitants are Protestants, and numerous schools are established throughout the canton. The executive power is vested in a council of 6, who hold office for 6 years. The grand council or legislature consists of 100 members, half of whom retire every year. It is presided over by 2 *Landammans* chosen annually. Capital, Frauenfeld.

THURINGIA (Ger. *Thüringen*), a central region of Germany, between the Hartz mountains on the N. and the Thuringian Forest on the S., the river Saale on the E. and the Werra on the W., the principal parts belonging to the Prussian province of Saxony, to Coburg-Gotha, Weimar-Eisenach, Schwarzburg-Sondershausen, and Schwarzburg-Rudolstadt. The Thuringians are mentioned among the allies of Attila in the middle of the 5th century. Their country was afterward subdued by the Franks and Saxons. The former ruled it for some centuries through dukes and margraves. Under the Saxon emperors several Thuringian counts or landgraves obtained a kind of semi-independence. Louis the Jumper, son of Louis the Bearded, warred against the emperor Henry IV. in the 2d half of the 11th century, and several of his successors added to the possessions of the house. A long war of Thuringian succession was waged about the middle of the 13th century, the termination of which left the principal parts of Thuringia in the possession of the margrave Henry of Meissen. After numerous vicissitudes and intestine struggles, the country was divided in 1485 between Albert and Ernest, the sons of Frederic the Mild, the founders of the Albertine and Ernestine lines of the house of Saxony, and has since that time not been reunited.—The Thuringian Forest (Ger. *Thüringerwald*), which bounds it on the S. W. and S., is a narrow and wooded mountain range, rising in some parts to the height of upward of 3,000 feet, and extending some 70 m. in length, not including numerous northern offshoots toward the Hartz. In the S. E. it approaches the Fichtelgebirge, and in the S. W. the Rhön, from which it is separated by the valley of the upper Werra. The inhabitants are chiefly engaged in mining, grazing, and manufactures. The territory covered or traversed by the Thuringian Forest is included in Prussian Saxony, Hesse-Cassel, Weimar-Eisenach, Coburg-Gotha, Meiningen, Schwarzburg-Rudolstadt, and the Reuss principalities.

THURLOW, Edward, lord, an English jurist and statesman, born at Little Ashfield, near Stowmarket, Suffolk, in 1732, died in Brighton, Sept. 12, 1806. He was educated at Caius college, Cambridge, where he gained no distinction as a scholar, and in 1754 was called to the bar by the society of the Inner Temple. He immediately entered upon a lucrative practice, which, after his appointment in 1761 as king's counsel, was exceeded by that of only 2 or 3 of the most eminent advocates of the time. In 1768 he was elected to parliament as a supporter of Lord North; in 1770 he was appointed solicitor-general, in 1771 attorney-general, and in 1778, as a reward for the zeal and energy with which he advocated the policy of the government respecting America, he was made lord chancellor, and raised to the peerage as Baron Thurlow. By the express command of the king, whose confidence he had gained to a remarkable degree, he retained the office of lord chancellor in the Rockingham and Shelburne administrations, which succeeded that of Lord North, notwithstanding he was politically opposed to his coadjutors, and lost no opportunity to defeat their leading measures. The confusion thereby caused in the cabinet led to the withdrawal of Fox; and in the coalition ministry which succeeded, it was expressly stipulated that Thurlow should not hold a seat. He still remained in confidential relations with the king, and upon the accession of Pitt to power, in Dec. 1783, received again the great seal, which he held for 9 years. At first he acted apparently in harmony with his colleagues; but having been suspected, after the king's insanity in 1788, of tampering with the prince of Wales and the whigs, he was looked upon with distrust by Pitt, for whom he in turn entertained a cordial dislike which he was at no pains to conceal. Gradually he began, as formerly under the Rockingham administration, to oppose certain measures of the cabinet, and the disturbance thus created led to his removal from office at the express request of Pitt, and with the ready consent of the king, a result which deeply mortified him. He never afterward held office or took a leading part in politics; and having no personal influence, he soon sank into comparative insignificance, notwithstanding he is said to have been confidentially consulted by members of the royal family until near the close of his life. He was a man of overbearing and passionate character, a bully rather than a debater in parliament, though occasionally an impressive and eloquent speaker.

THURN AND TAXIS. See Post, vol. xiii. p. 512.

THURSDAY, the 5th day of the week, the *dies Jovis* of the Roman calendar, and sacred in the northern mythology to the thunderer Thor, for whom it is named. In German it is called *Donnerstag* (thunder day).

THURSTON, a S. W. co. of Washington territory, bounded N. E. by the Nisqually river and E. by the Coast range; area about 400 sq. m.; pop. in 1860, 1,507. Much of the surface is mountainous, but there are several rich valleys which produce wheat, corn, oats, and other grains and potatoes in great abundance. An arm of Puget's sound extends into the N. E. part, and the line of Gov. Stevens's proposed Pacific railroad passes through the county. It has 2 churches and a newspaper. Capital, Olympia, which is also the capital of the territory.

THYESTES. See Atreus.

THYLACINE, or Pouched Wolf, a marsupial animal of the dasyurine family, and genus *thylacinus* (Temminck) or *peracyon* (Gray), peculiar to Tasmania; both of the generic names indicate the possession of the pouch characteristic of the order. In this genus the dentition is: incisors $\frac{8}{6}$, the outer slightly the largest; canines $\frac{1-1}{1-1}$, large, simply conical, the upper separated from the incisors by a deep concavity in which the apex of the lower is received when the jaws are closed, in this differing from carnivora proper, in which the lower canines pass outside of the upper jaw; premolars $\frac{3-3}{3-3}$, separated from each other; molars $\frac{4-4}{4-4}$, with a large central cusp, and 2 smaller, one in front and the other behind it. The humerus has the inner condyle perforated, the hind feet have no inner toe, and the marsupial bones are absent, represented only by fibrocartilage; the female has a distinct pouch, with 4 mammæ. Only one species is described, the dog-headed thylacine (*T.* [*P.*] *Harrisii*, Temm.), about the size of a young wolf, or 3¼ feet long, with a tail 20 inches additional, and a height at the shoulders of about 22 inches; the head is dog-shaped, with narrow and elongated muzzle; ears short, pointed, very broad at the base, and well covered with hair on both surfaces; eyes full and black, with a nictitating membrane; long black bristles on the upper lip, and a few on the cheeks and above the eyes; the claws stout, short, and brown, the bottoms of the feet with large, very rough pads. The fur is short and close, waved and slightly woolly; the general color is grayish brown, paler below, with 12 to 14 transverse black bands on the back, longest and widest posteriorly; pale around eyes, and edge of upper lip white; tail with short fur, with longer hairs at under side of apex; rusty red about the pouch. From its general resemblance to a wolf or large dog, some have placed it among carnivora, and Swainson ranked it with the cats; the legs are shorter in proportion than in the wolf, and the gait is semi-plantigrade. It is a wild and shy animal, inhabiting the caverns and dismal glens of mountainous districts; inactive during the daytime, probably from imperfect vision, it preys at night upon the smaller marsupials, and in former years attacked sheep to the considerable loss of the colonists; it is sometimes so large as to be a match for several dogs, and is the most formidable of the Australian quadrupeds; it is rare except in the most inaccessible regions; specimens have been exhibited alive in the zoological gardens of London.—Among the fossil remains of the caves of Wellington valley, New South Wales, Prof. Owen has described parts of lower jaws of what he calls *T. spelæus*, differing from existing ones in their greater depth. In the secondary schists of Stonesfield has been discovered the genus *thylacotherium* (Owen), known by the lower jaw, which has 6 incisors, 2 moderate canines, 6 false and 6 true tricuspid molars; the *T. Prevostii* (Cuv.) was about the size of a rat. An allied genus from the same strata is *phascalotherium*(Broderip), of somewhat larger size.

THYME (*thymus*, Linn.), an aromatic herb used in culinary processes. It belongs to the natural order of *labiatæ*, and the genus comprises about 30 species, mostly natives of Europe, all undershrubs with pretty purplish flowers. The common or garden thyme (*T. vulgaris*, Linn.) has an upright stem about a foot high, clothed with soft hairs, sessile, linear, or ovate-lanceolate, acute leaves, with revolute edges in clusters in the axils; the flowers in cymules, small; calyx hirsute, strongly ribbed, punctate; corolla pale purple. It is a native of S. W. Europe, growing on bare hills and in dry plains, but has been long known in the kitchen garden, and is readily cultivated. There are several varieties, such as the broad-leaved, the variegated-leaved (much preferred for its beauty), and the golden or yellow-leaved, with a citron-scented smell. The last named is continued by cuttings or slips of the root, only the normal condition of the plant being certain from seeds. The wild thyme or mother of thyme (*T. serpyllum*, Linn.) has a procumbent habit, with half-woody stems rising only about 3 inches high; its leaves are ovate, blunt, petiolate, a little ciliate at base; the flowers usually purple, but sometimes white, constituting a permanent variety. The wild thyme affects certain kinds of pastures and dry heaths, completely overrunning them, and its presence indicates soils peculiarly adapted to sheep husbandry. It has likewise become a naturalized plant in eastern Massachusetts and in Pennsylvania.—The thymes contain carminative properties, but are not much esteemed in medicine. A volatile oil is distilled from the garden and wild thyme. Bees are very fond of this plant, and the honey obtained from it is of superior quality. The thyme of Mt. Hymettus is celebrated.

THYMUS GLAND (Gr. ϑυμος), one of the vascular or ductless glands, situated, in the human subject, in the upper part of the anterior mediastinum, extending in childhood from the thyroid gland to near the diaphragm, but becoming atrophied after the age of puberty. It is oblong, bilobed, flattened from before backward, bifurcated at each end, with a thoracic and a cervical portion on each side, the general cavities of which communicate with each other; it is gland-like in structure, soft, grayish white, covered with a capsule of areolar tissue, which sends prolongations inward, dividing it into unequal lobules; its cavities, when fully developed, contain corpuscles, apparently nuclei of glandular cells, secreting elements, but without any secreted product. It rests upon the trachea, thyroid and subclavian veins, superior vena cava, and arch of aorta, having in front of it the sterno-hyoid and sterno-thyroid muscles and the upper part of the sternum. It receives a very large supply of blood during the period of its functional activity from the internal mammary and thyroid arteries, and other vessels in the neighborhood; its lymphatics are large, communicating directly with the vena cava. It first appears as a single tube, closed at both ends and filled with granular matter, from which spring buds or branches, which at the period of complete development form an assemblage of hollow glandular lobules whose cavities communicate with a central reservoir having no outlet. It is generally stated that this gland attains its greatest development during the latter part of fœtal life, and it has been accordingly considered as peculiarly connected with the embryonic condition; but recent observations show that its most rapid growth is, in the human infant, soon after birth, when also its functional activity is greatest; it soon becomes less active, growing with the rest of the body till about the age of 2 years, then remaining stationary for a few years, and gradually changed about the time of puberty into a mass of fat, the corpuscles of its interior being developed into fat-secreting cells; this change of function is most remarkable in hibernating mammals and reptiles, in which the organ continues to grow till adult age. It is about the same in the anthropoid apes as in man, and is remarkably developed and may be well studied in the calf, in which, and in the lamb, it is called the sweetbread; it exists in mammals, birds, and in most reptiles, but not in the larvæ of batrachians, the perennibranchiate amphibians, nor fishes. Simon (who, with Sir Astley Cooper, has made the most careful researches on this organ) considers it coextensive with pulmonary respiration, and says it fulfils a use "as a sinking fund in the service of respiration;" this view he thinks is confirmed by its size in hibernating animals, in which the breathing process is reduced to an extremely low ebb, yielding fatty fuel for respiration. Other physiologists, admitting this in the case of hibernation, maintain that it performs the different function in the rapidly growing child of elaborating plastic material. The large amount of blood sent to it indicates an active process of cell growth, the products of which are discharged into the current of the venous circulation, probably preparing, according to Carpenter, albuminous material for higher uses in the formative operations of the system; it may also act as a storehouse of nutritive material which may be drawn upon as the system requires it during growth, and supply germs of cells which are ultimately to become blood corpuscles. In over-driven lambs it rapidly diminishes, and gradually increases again with rest and plentiful food. Its diseases are very little known; but it is certain that the suffocative paroxysms of the so called "thymic asthma" of Dr. Kopp have no essential connection with an enlarged thymus gland.

THYROID GLAND (Gr. ϑυρεος, a shield, and ειδος, form), one of the vascular or ductless glands, situated on the anterior and lower part of the larynx, in front of the upper rings of the trachea. It is composed of 2 elongated ovoid lobes, flattened from before backward, united or separate, but generally connected by a transverse portion; it is covered by the muscles of the front of the neck. The tissue is tolerably firm, brownish and yellowish red, formed of lobes and lobules, consisting essentially of an aggregation of closed gland vesicles imbedded in condensed areolar tissue; these contain a small amount of a fatty albuminous fluid, and do not communicate with any common reservoir; among the vesicles are nucleated corpuscles or epithelial cells; it receives 4 arteries from the subclavians and the carotids, nerves from the pneumogastric and the sympathetic, and lymphatics communicating with the glands of the neck. The vascular supply is great, and forms a very minute capillary plexus on the membrane of the vesicles; it is developed as in other ductless glands (see THYMUS GLAND), like which it is relatively larger in intra-uterine existence and in infancy than in after life. Its products are discharged into the venous blood, and probably, like the thymus, it prepares albuminous material for the higher formative operations, and contributes to the supply of new blood corpuscles; Simon considers it a diverticulum to relieve the cerebral circulation, as the spleen is to the portal, from the proximity of the origin of both sets of vessels. It is usually larger in females than in males, showing that it does not influence the vocal apparatus; it is found in all mammals, birds, and reptiles, probably in the batrachians, and perhaps also in fishes. The organ may be inflamed, with suppuration, and variously enlarged, as in the disease called bronchocele. (See GOITRE.)

TIAHUANICO, the name of ruins situated on the shores of Lake Titicaca, Bolivia, in lat. 16° 42′ S., long. 68° 42′ W. They hold the same relation to the aboriginal monuments of South America that those of Palenque sustain to the ancient remains of Central and North America; and they indicate a different and higher order of art than was found to exist, at the time of the Spanish conquest, in any other part of that continent. The ancient Peruvians had but the vaguest traditions concerning them, believing that the structures of which they are the remains were raised in remote ages, by giants, in a single night. The chroniclers of the conquest have described them, and their accounts do not differ materially from those of modern travellers. They are nevertheless in a state of extreme dilapidation, with all the evidences of remote antiquity. Some of the structures seem to have been built on a pyramidal plan, and to have covered several acres; but the most remarkable features still remaining are monolithic doorways, pillars, and statues of stone, elaborately sculptured in a style wholly different from any other remains of art yet found in America. One of these doorways is 10 ft. high, 18 ft. broad, with an opening 6 ft. 4 in. by 3 ft. 2 in., the whole cut from a single stone. Its E. front has a cornice, in the centre of which is a human figure of strange form, crowned with rays, interspersed with serpents with crested heads. On each side of this figure are three rows of square compartments, filled with human and other figures, of apparently symbolic design. The statues are broken, so that it is difficult to state their original dimensions; but these may be inferred from the size of the head of one, which is 4 feet in length and of proportionate width. The whole neighborhood is strewn with vast blocks of stone elaborately wrought, some of which, excavated in 1846, measure 8 ft. in length by 18 ft. in width, and 6 ft. in thickness. On some of the islands of Lake Titicaca are other monuments, of great extent, but of true Peruvian type, apparently the remains of temples destroyed on the arrival of the Spaniards. Those of the island of Coati, however, have many features in common with the ruins of Tiahuanico, and probably belong to the same epoch, and are to be ascribed to the same unknown and mysterious people who preceded the Peruvians as the Tulhuatecas or Toltecs did the Aztecs.—Tiahuanico is 12,930 feet above the sea, and the country around it is cold and relatively barren. The ruins stand on an eminence, which, from the water marks around it, seems to have been formerly an island in Lake Titicaca; but the level of the lake is now 135 feet lower, and its shores 12 miles distant. This fact, in conjunction with others, warrants the belief that these remains antedate any others known in America.

TIARA (Gr.), a species of high hat anciently worn by many eastern nations. Those of kings, priests, and persons of rank terminated in the upper portion in a sort of crown, whence in modern times the term tiara has been applied to the triple crown worn by the popes, and which in turn bears a striking resemblance to the crowns worn by the Assyrian kings, as represented on the slabs discovered at Nineveh.

TIARELLA, the name of a genus of hardy herbaceous plants of the saxifrage family, commonly called bishop's cap. One of the earliest spring flowers in our woods and on the northern slopes of the Alleghanies is the *tiarella cordifolia*, with a creeping root sending out runners, and clothed with persistent, hairy, heart-shaped, lobed and toothed leaves on long hairy petioles. The flowers grow upon a long simple raceme, are entirely white, with lanceolate-acute petals, and the stamens with yellow anthers. Two or three other species are found wild in the extreme north-west. The tiarella is easily propagated in sandy peat, and is much esteemed abroad.

TIBALDI, PELLEGRINO, otherwise called Pellegrino Pellegrini, an Italian painter and architect, born in Bologna in 1527, died in Milan about 1598. At 20 years of age he visited Rome, where he studied carefully the works of Michel Angelo, but met with little success as painter or architect, both of which professions he followed, until he was employed by Cardinal Poggio to decorate his palace in Bologna. In 1586 he was invited by Philip II. to Spain, and during a residence there of 9 years executed elaborate series of frescoes in the lower cloister of the Escurial and on the ceiling of the library, beside many easel pictures, now in the churches of Madrid and elsewhere. His most successful architectural designs were the modern façade attached to the cathedral of Milan, and the Casa Professa, or house of the Jesuits, in Genoa. He endeavored to give softness to the severe forms of Michel Angelo, and was called by the Carracci the *Michelagnolo Riformato*.

TIBBOOS. See TUARICKS.

TIBER (It. *Tevere*; anc. *Tiberis*), a river of Italy, rising at the foot of Monte delle Balze, in the Tuscan Apennines, and thence pursuing a general southerly course to Fiano, where it turns S. W., and passing through the city of Rome discharges its waters into the Mediterranean at Ostia by two mouths, which enclose the Insula Sacra of the ancients. Its length is about 200 m., and its width at Rome and below from 300 to 500 feet. Its principal affluents are the Chiasco, the Velino, the Nera, and the Teverone on the left, and the Nestore, the Naia, the Paglia, the Vizza, and the Ricano on the right side. It is navigable for vessels of 130 to 200 tons to Rome, 18 m. from its mouth, and for boats to the confluence of the Nera, about 90 m. Rome and Perugia are the principal cities in its basin. From Perugia, above its confluence with the Chiasco, to its debouchure, its waters have a yellowish tinge, the result of the yellow clay through which it passes; and this color is perceptible at sea for some miles from its mouth. In the upper part of its course, between Todi and the Passo del Forello, it is obstructed by rapids and passes for some miles through a narrow gorge. It is the largest and most important river of peninsular Italy.

TIBERIAS. See GENNESARETH.

TIBERIUS, the third emperor of Rome, born Nov. 16, 42 B. C., died March 16, A. D. 37. His full name was Tiberius Claudius Nero Cæsar. He was the eldest son of Claudius Tiberius Nero and Livia Drusilla, and was born amid the troubles of the civil war, in the dangers of which both his parents shared. His father had embraced the cause of Antony during the Perusian war, was forced to flee from Naples with his wife and infant son, and wandered through Sicily and Achaia until the reconciliation of Antony and Octavius in 42 B. C. enabled him to return to Rome; and in 38 he divorced his wife in order that she might be married to Augustus. In 33 the father of the young Tiberius died, and his funeral oration was pronounced before the rostra by his son, then only 9 years old. The latter was educated by the emperor with princely care, and early showed evidence of great talents; but the attention he paid to his studies and his natural reserve, the inheritance of the Claudian family, led his companions to give him the title of the "old man." In 29 he accompanied Augustus in his triumphal entry into Rome, and subsequently married Vipsania Agrippina, by whom he had a child named Drusus; but in 11 he was compelled by the policy of Augustus to divorce her, much against his will, and marry the beautiful but dissolute Julia, the daughter of the emperor. In spite of her licentiousness he seems to have lived peaceably with her for a year, and had by her one child which did not live; and after that event the feelings of dislike between them gradually increased until they led to a virtual separation. Tiberius during the lifetime of Augustus took an active interest in military affairs. As military tribune he made his first campaign in the Cantabrian war. In 20 he went to Asia Minor, restored Tigranes to the throne of Armenia, and compelled the Parthians to give up the eagles taken from Crassus; in 15 he and his brother Drusus carried on a war against the Alpine nations of Rhætia, and the exploits of the two were celebrated by Horace. In 13 Tiberius became consul with P. Quintilius Varus; in 11 conducted the war against the revolted Dalmatians and the Pannonians; and in 9, when Drusus was fatally injured in Germany, he hastened from Pavia to the place where his brother was dying, and after his death conveyed the body to Rome, walking all the way before it on foot, and on arriving in that city pronounced over it a funeral oration in the forum. He returned to Germany, gained several victories, and crossed the Rhine, but in 7 B. C. he went back to Rome, celebrated his second triumph, and was made consul a second time. The following year he obtained tribunitian power for 5 years, an unusual distinction, but suddenly formed the resolution of retiring to Rhodes. The reason for this movement is not certainly known. According to Tacitus, it was to get away from the licentiousness of his wife; but other authorities state that the step was taken on account of the growing jealousy between himself and the grandsons of Augustus. At Rhodes he resided 8 years, living in a very simple style, on terms of friendly intercourse with Greek philosophers and poets, and studying among other things astrology. While absent his wife was banished (2 B. C.) to the island of Pandataria, and at the expiration of his tribunitian power Tiberius asked leave to return to Rome; but Augustus, who in the first place had been unwilling that he should depart, was now as unwilling that he should come back, and it was not until A. D. 2 that the required permission was granted. Even this was not given except with the consent of Caius Cæsar, the grandson and heir of the emperor, and with the pledge that he would take no part in public affairs. The death of the two grandsons of Augustus left Tiberius the succession to the throne, and in A. D. 4 he was adopted by Augustus. From this time to the death of the reigning emperor he was constantly employed in military operations, in which he manifested signal ability. He conquered all Illyricum, gained great victories over the Germans and the Dalmatians, and in A. D. 12 celebrated his fourth triumph. His military successes were all important, as the loss of Varus and his legions in Germany had placed the empire in danger. In A. D. 14 he started for Illyricum to conduct the war in that quarter, when he was recalled by the death of Augustus to ascend the throne. One of the first acts of his reign was to put to death Agrippa, the only surviving grandson of Augustus, alleging that the execution was in accordance with the wishes of the late emperor. Hitherto he had conducted himself in a manner to inspire respect, if not affection, and his military reputation was deservedly very high. The first years of his reign were marked by prudence and moderation. He rejected all flattery from the senate, placed in office the most worthy persons, and made efforts to relieve the scarcity of bread constantly recurring in Rome. Meanwhile the legions in Pannonia upon the death of Augustus were roused into a mutiny, which was only quelled by the energy of Drusus, the emperor's son, and the terror inspired by an opportune eclipse of the sun. The armies on the Rhine under Germanicus, the nephew of Tiberius, manifested also no friendly feeling for the new monarch, but the fidelity of their leader prevented any serious consequences. The first year of his reign was likewise marked by the death of his wife Julia, whom since his accession he had deprived of the allowance granted her by her father. Under the influence of Sejanus, who had become his favorite, the natural severity of his temper began soon to degenerate into cruelty. The election of magistrates was taken from the popular assembly and transferred to the senate, which sat simply to register the decrees of the emperor. The charges of *læsa majestatis*, by which all persons suspected of impugning by word or deed the majesty of the emperor were tried, were prosecuted with great severity. The secret police of *delatores*, or spies, was rapidly organized, and by their infernal machinations exposed the life, the fortune, and the honor of every Roman citizen to hourly danger. After the death of Germanicus (see GERMANICUS) the emperor surrendered himself more and more to the influence of Sejanus. By his advice the prætorian cohorts, stationed hitherto in various parts of the city, were assembled in one camp, situated in the vicinity of Rome. At the same time the power of the empire was thoroughly maintained in the provinces, and two revolts in A. D. 21, one on the Moselle headed by Julius Florus, and the other among the Ædui headed by Julius Sacrovir, were put down and their leaders forced to slay themselves to escape from the imperial troops. In 23 Sejanus caused the death of Drusus by poison. Whether Tiberius felt any sorrow or not, he certainly manifested none; and when the people of Troas sent him a message of condolence, he sneeringly sent back an answer of condolence on the death of their fellow citizen Hector. In 26 the emperor left Rome, never to enter again within its walls. His retirement was dictated probably in part by the machinations of Sejanus, who wished to raise himself to the supreme power, but still more by his hatred of a city where his love of privacy was subject to be constantly disturbed. He first went to Campania, and there issued an edict commanding the people not to molest his retirement; but he gained a fuller security from intrusion the following year by going to Capreæ. The early part of his reign had been marked by a strict regard for external decency, and a stringent law had been passed against courtesans; but his last years were spent in the most infamous pleasures. The island of Capreæ became the haunt of a most disgusting debauchery, especially after the death of Livia Drusilla in 29, who had always exercised much influence over her son. Although he paid her respect and obedience, he did not pretend to an affection which he did not feel. He had left Rome partly to be out of her way, and in her last illness he refused to visit her. Henceforth Sejanus had the full control of affairs of state, and bent every thing to the accomplishment of his own ambitious designs. The employment of *delatores* gave abundant means of getting rid of obnoxious individuals on false charges. Tiberius, who had been suspecting for some time the plots of his minister, managed to get rid of Sejanus in 31, and the favorite and all his family were destroyed. In the mean time conscience was doing its work, and the emperor became, in the words of Pliny, "the most wretched of men." In the remarkable letter sent to the senate, which Tacitus has preserved, he begins with a frank avowal of his misery. "What to write to you," he says, "or how to write, I know not; and what not to write at this time, may all the gods and goddesses torment me more than I daily feel that I am suffering, if I do know." About this time he left his retreat in Capreæ, went once more to Campania, and occasionally came as near Rome as his gardens in the Vatican. But his privacy was never disturbed; soldiers were placed so as to prevent any one from coming near him. Though formerly remarkable for beauty and majesty of person, dissipation had covered his face with ugly blotches, and his body was bent nearly double. At Astura he was attacked by sickness, and reached Misenum to die in the villa of Lucullus. According to Tacitus, it was left to fate to determine his successor. On March 16 he had a fainting fit, and being thought dead, Caius Caligula was saluted as his successor; but the emperor suddenly recovering, a quantity of clothes was thrown over him and he was left alone. There is another account of his death. The people hailed the event with delight, and the cry of "Tiberius to the Tiber" was heard constantly in the streets of Rome. He however had a public burial, but did not like Augustus receive divine honors. The chief authorities for his life are Suetonius, Dion Cassius, and above all Tacitus. He wrote a commentary of his own life, Greek poems, an ode on the death of L. Cæsar, and several epistles and orations, either to the senate or on occasion of funerals; and were he to be judged by his words and not his deeds, he would doubtless be deemed one of the best and wisest of the Roman emperors.

TIBET. See THIBET.

TIBULLUS, ALBIUS, a Roman elegiac poet, who flourished during the reign of Augustus. He was of an equestrian family, and spent the greater portion of his life on his ancestral estate at Pedum between Præneste and Tibur. Though naturally averse to a military life, he went to Aquitania in 31 B. C. with his patron

Messala, who had been sent thither to quell an insurrection; and when Messala had pacified that part of Gaul and set out to take command in the East, Tibullus accompanied him, but falling sick returned to Rome. With this his military life ended. Four books of elegies are attributed to him, but the third book is considered spurious. Tibullus was a warm friend of Horace, and two poems addressed to him by the latter are extant. He died while still young. The first edition of his works was printed along with Catullus, Propertius, and the Silvæ of Statius at Venice in 1472. Of the late editions, two of the best are those of C. Lachmann (Berlin, 1829) and Dissen (Göttingen, 1835). They have been translated into English verse by Dr. Grainger (1752), and a prose translation forms a volume of Bohn's "Classical Library" (London, 1854).

TIBUR. See Tivoli.

TIC DOULOUREUX. See Neuralgia.

TICINO, or Tessin, a S. canton of Switzerland, bounded by Uri, Grisons, Lombardy, Piedmont, and Valais; area, 1,082 sq. m.; pop. in 1860, 131,396, all but 118 Roman Catholics. The surface is mountainous, but the N. part is more elevated than the S., that frontier being formed by several of the most lofty summits of the Alps, including the Splugen, Mt. St. Gothard, and Mt. St. Bernard, and a considerable portion of it belongs to the glacier region. The face of the country has a general slope toward the S., and lofty mountain ridges traverse it in that and a S. E. direction, and send numerous offsets to both sides, the whole forming many valleys, each traversed by a mountain stream. With the exception of a small part of the south, the whole drainage belongs to the basin of the Po. The principal river is the Ticino, which, rising in Mt. St. Gothard and receiving numerous tributaries, flows through Lago Maggiore, a small portion of which is within the boundary of the canton, to the Po near Pavia. There are several other lakes, the most important of which are Lugano, Muzzano, and Origlio. The elevated surface of the N. part of the canton is not well suited for agriculture, but in the S. the lower slopes are covered with forests of chestnuts, and the valleys with vineyards, corn fields, and plantations of figs, almonds, oranges, citrons, mulberries, and pomegranates. In the elevated part large numbers of cattle are reared, and the inhabitants are chiefly occupied in preparing dairy produce. Game is abundant in the forests, and the streams and lakes are well stocked with fish. The manufactures are confined to a few articles for domestic use. A trifling transit trade is carried on through this canton between Switzerland and Italy, and small quantities of silk, fruits, cheese, skins, marble, crystals, and timber are exported. The inhabitants belong to the Italian race, and speak that language. Large numbers of the men annually migrate to other countries in search of employment, and leave the care of their cattle and farms to the women in their absence.—Ticino was conquered from Italy by the Swiss in 1512, and, under the name of the Italian bailiwicks, governed by deputies until 1815, when it was admitted as a member of the Swiss confederation. The government is vested in a council chosen by all citizens who have attained the age of 25 years, and possess property either in fee to the value of $40 or a life estate of $60; the council meets alternately at Lugano, Locarno, and Bellinzona. The canton pays $5,500 annually as its share of the support of the confederate government, and furnishes a contingent of 1,804 men.

TICK. See Epizoa, vol. vii. p. 253.

TICKELL, Thomas, an English poet, born in Bridekirk, Cumberland, in 1686, died in Bath, April 23, 1740. He was educated at Queen's college, Oxford, and in 1710 was chosen fellow, and by a royal dispensation was allowed to hold his fellowship without taking orders. Some praises of Addison's opera of "Rosamond" gained him the favor of that author, and from that time the most intimate friendship existed between them. During the negotiations for peace with France, Tickell published a poem entitled "The Prospect of Peace," which rapidly went through several editions on account of the praise bestowed upon it by the "Spectator." On the arrival of King George I. he wrote "The Royal Progress," printed in the "Spectator." But his greatest production was his translation of the first book of the Iliad, which was brought out in opposition to that of Pope. Addison declared that this now forgotten version was the best ever made, and it has been suspected that he himself was the translator. Beside some minor poems, the only remaining work from his pen is one entitled "Letter to Avignon," written during the dispute on the Hanoverian succession, and an elegy on Addison, prefixed to the edition of his works, of which Dr. Johnson expressed the extravagant opinion that it was equal for sublimity and elegance to any funeral poem in the English language. Addison had employed Tickell in public affairs, and when in 1717 he was appointed secretary of state, he made him his under secretary. In 1725 Tickell became secretary to the lords justices of Ireland, in which situation he died.

TICKNOR, George, an American author and scholar, born in Boston, Aug. 1, 1791. He was graduated at Dartmouth college in 1807, and afterward devoted three years in his native town to the study of the ancient classics, availing himself of the best aids and facilities which the educational resources of the time and place afforded. After the usual preparatory course he was admitted to the bar in 1813, but his connection with the legal profession was never any thing but nominal. For the purpose of securing a wider and more thorough cultivation than his own country at that time afforded, he embarked for Europe in 1815, and remained abroad 5 years, residing at Göttingen, Rome, Madrid, Paris, Edinburgh, and London, and becoming acquainted with Goethe, Lord Byron, Sir Walter Scott, Mme. de Staël, Jeffrey, Rogers, Lord Holland, Roscoe, Mackintosh, Wordsworth, Southey, and other distinguished personages. Upon his return home he assumed the duties of a professorship recently founded in Harvard college of French and Spanish languages, literature, and belles-lettres, to which he had been chosen in his absence. He devoted himself to his new occupation with ardor and energy, giving an impulse to the studies of his department not merely by his excellent lectures, but by his diligent supervision of the elementary instruction in all its branches. He resigned his professorship in 1835, and went abroad a second time, accompanied by his family, and remained there 3 years. After his return he devoted himself principally to the preparation of a "History of Spanish Literature," a work which he had long meditated, and for which he had collected ample materials. It was published in New York in 1849 (3 vols. 8vo.), and at once attained the rank of a classic in the language. Its thoroughness, minute and accurate knowledge, sound judgment and unerring taste, and elegant and judicious criticism were acknowledged by the scholars of every country, and by none more heartily and unreservedly than by those of Spain itself. No other work on the same subject, in any language, could enter into comparison with it for fulness, comprehensiveness, and accuracy. It has been translated into Spanish and German. Mr. Ticknor has also edited "The Remains of Nathaniel Appleton Haven," with a memoir of his life. (See HAVEN, NATHANIEL APPLETON.) In 1825 he contributed to the "North American Review" a life of Lafayette, which was subsequently enlarged, and published in pamphlet form. Mr. Ticknor was also one of the association of writers by whom the "Monthly Anthology" was conducted. He is at present (March, 1862) occupied with a biography of his friend W. H. Prescott, and the preparation of a new and revised edition of his "History of Spanish Literature." For some years past Mr. Ticknor has been a trustee of the public library of the city of Boston, which owes much of its success to his judicious labors in its behalf.

TICONDEROGA, a post village and township of Essex co., N. Y., enclosing the outlet of Lake George, 95 m. N. by E. from Albany; pop. in 1855, 2,125. The portion of the town lying between Lakes George and Champlain is a lofty promontory, the terminus of a mountain ridge; Mt. Defiance at the extremity of the promontory is 750 feet above the surface of Lake Champlain. The outlet of Lake George, 4 m. in length, has a fall in 1¼ m. of 150 feet; and as the quantity of water never apparently varies, and is remarkably pure, it forms a very valuable water power. There is a vein of graphite of excellent quality in the town, and about 30 tons of black lead are produced annually. Large quantities of lumber are manufactured here, and there are extensive tanneries.—The town is particularly remarkable for the prominent place its fortifications have held in American history. Early in 1755 the French, who had already occupied and fortified Crown Point, and caused a careful survey of Lake Champlain to be made, advanced to Ticonderoga and commenced a fortification there, which entirely commanded the passage of the lake. This fort they named Carillon (chime of bells), in allusion to the music of the waterfalls near it. It was afterward known as Fort Ticonderoga. Sir William Johnson was the commander of an English and colonial army the same year intended for the reduction of this fortress and Crown Point; but learning that the French had reënforced it largely, he contented himself with fortifying Fort William Henry at the S. end of the lake. In 1757 Montcalm assembled a force of 9,000 men at Fort Carillon, and ascending Lake George attacked and reduced Fort William Henry, Aug. 3. In the summer of 1758 Gen. Abercrombie took the command of an expedition for the reduction of Fort Carillon, crossed Lake George with 15,000 men, and on July 8 attempted to take the fort by storm, but was repulsed with a loss of 2,000 men. In 1759 Gen. Amherst at the head of 12,000 men proceeded to invest Ticonderoga, and the French, not having a sufficient force to hold it, dismantled and abandoned it, July 30, and soon after Crown Point was also abandoned. The English government then enlarged and strengthened the two fortresses at an expense of $10,000,000. The fort and field works of Ticonderoga extended over an area of several miles. After the cession of Canada in 1763, the fort was allowed to fall into partial decay, and was held by a small force. Upon the receipt of the news of the battle of Lexington, Col. Ethan Allen surprised the fort, May 10, 1775, and captured the garrison of 50 men and the artillery and munitions of war in the fort. (See ALLEN, ETHAN.) In 1776, after an engagement between the British and Americans, the latter were compelled to take refuge under the guns of Fort Ticonderoga. On June 30, 1777, Burgoyne invested the fort, and on July 4 erected a battery on Sugar Loaf hill (now Mt. Defiance), which completely commanded it and compelled the garrison to evacuate it the next night, sending their stores and munitions to Skenesborough (now Whitehall), and escaping themselves into Vermont. In September of the same year Gen. Lincoln made an attack upon the works, took Mts. Hope and Defiance, released 100 American prisoners, and took 293 of the enemy, an armed sloop, several gun boats, and more than 200 bateaux, but did not capture the fort. After the surrender of Burgoyne the fort was dismantled, and the garrison retreated down Lake Champlain; a portion of them were captured by Capt. Ebenezer Allen. In 1780 Gen. Haldeman with a company of British soldiers advanced to Ticonderoga and occupied it for some time; and from this point Major Carleton made a diversion against Forts Anne and George, in favor of Sir John Johnson. After the war the fort was suffered to fall into ruins, the extent of which is the only existing indication of its old importance.

TIDES, the alternate rising and falling of the waters of the ocean, which is to be observed on all its coasts and estuaries. The rising is designated as the flood, and the highest elevation as high water; the falling is called the ebb, and the lowest depression low water. The duration of high and low water without apparent change of level is known as the stand, and the cessation of the ebb and flood streams or tidal currents is called slack water. If we suppose an observer stationed on the shores of a bay communicating with the open sea, as on Governor's island in New York bay, he will remark certain regular changes in the state of the water. The first and most important of these is that the surface of the water rises and falls regularly twice in every day. A closer attention will show that the tides of each day occur somewhat later than those of the preceding day, the average retardation from day to day being about 50 minutes. In a short time he will find that the times of occurrence of high water bear a very close relation to the appearance of the moon in certain positions. Thus at New York high water occurs when the moon is about E. S. E.; at Newcastle, on Delaware river, when the moon is nearly S.; at Baltimore when it is rising or setting. These are rude statements, but they are sufficiently accurate for many purposes, and they show at once the close connection between the time of high water and the time of the moon's passage over the meridian. In fact, so completely is this recognized, that, in order to give the time of high water upon any day, it is usually thought sufficient to state the time of high water on the days of new moon and full moon (or "full and change") when the moon passes the meridian at 12 o'clock nearly. This time is called the establishment of the port. Then to find (roughly) the time of high water on any other day, it is only necessary to add the establishment to the time of the moon's meridian passage on that day. There will also be another high water on the same day, preceding or following that so found by 12h. 25m. nearly. On closer examination it will be found that the interval between the time of the moon's passage over the meridian and the time of high water varies sensibly with the moon's age. At new moon, full moon, first quarter, and third quarter (or rather on the day following each of these phases), the interval between the time of the moon's passage and the time of high water is nearly the same; but from new moon to first quarter, and from full moon to third quarter, the high water occurs earlier than would be inferred by using that same interval; and from first quarter to full moon, and from third quarter to new moon, it occurs later than the same interval would give it. If the observer examines the height of the water, he will find that the height at high water and the depression at low water are not always the same. On the days following new moon and full moon, high water is higher and low water lower than at any other time; these are called spring tides. On the days following the first and third quarters, high water is lower and low water higher than at any other time; these are called neap tides. Thus at New York the rise and fall (that is, the difference in elevation between high water and low water) is about 5½ feet at spring tides, and 3½ feet at neap tides. At Boston this variation is from 11¼ to 8½ feet. He will further notice that there is a sensible difference in height between the two successive high waters or low waters, one occurring before noon, the other after noon, and that these differences are most perceptible when the moon is at her greatest declination N. or S., and that they disappear when she is near the equator. There are other variations of height depending on other circumstances; but they require, for the most part, very numerous observations to establish the fact of their existence, and to give a measure of their amount. —Upon examining the circumstances of a single tide, the following facts will attract notice: The interval from high water to low water is greater than that from low water to high water; the difference between these intervals is sensibly greater at spring tides than at neap tides. The tidal current in the bay runs upward for some time after high water, and after changing its direction continues to run downward for some time after low water, when it again changes its direction, and runs upward. If we further examine the state of the tide in different parts of the same river, or in a bay of great length as compared with its breadth, as for instance Chesapeake bay, we shall find that near the mouth there is very little difference between the interval from high to low water and that from low to high water; also that the current runs up the channel for a long time (sometimes approaching to 3 hours) after high water, and runs down the channel for as long a time after low water. In going up the bay we find that the high water occurs later and later, but yet that the velocity with which the high water travels is so great as entirely to preclude the idea of explaining the tide by supposing the same mass of water to have been moved all the way up the bay. Thus, high water is 13 hours in travelling from Cape Henry to the head of Chesapeake bay, a distance of 190 m., moving with an average velocity of 15 m. per hour, while the greatest observed current is less than one mile per hour. High water takes place simultaneously near the head and the mouth of the bay, while it is low water at the same time near the middle. The interval from low water to high water diminishes as we go up the bay, as also the difference between the stand and slack water. At the entrance of the bay the ebb current begins 3 hours after the high water stand; in the vicinity of Annapolis it is but one hour, and at the head of the bay there is only half an hour between the high water stand and the commencement of the ebb current.—The phenomena which we have described must necessarily have been remarked, for the most part, by all nations bordering on the ocean, and the fact that they are in some way connected with the moon could not escape their notice. Owing to the circumstance that in the Mediterranean sea, as in other seas of small extent, the tide is nearly imperceptible, the Greeks had little opportunity of observing them. Herodotus speaks of the tides in the Red sea. Plutarch says that Pytheas of Marseilles, who had observed them in Britain, ascribed them to the moon. Cæsar, in his account of the invasion of Britain, refers to the nature of spring tides as well understood in connection with the moon's age. Pliny explains the phenomena at some length, and ascribes them to the sun and moon dragging the waters along with them. Kepler in accounting for the tides had evidently been aware of the principle of gravitation, but not of the law. He says that all bodies attract each other, and that the waters of the ocean would all go to the moon were they not retained by the attraction of the earth. He then proceeds to explain their elevation under the moon and on the opposite side, because the earth is less attracted by the moon than the nearer waters, but more than the waters on the opposite side. These views, which contain the true explanation of the tides, although in an undeveloped state, were not generally accepted by his contemporaries. Galileo, to whom they were known, rejects them, and prefers another theory which it is not necessary to state here. The honor of a complete explanation of the causes of the tides was reserved to Newton, who laid hold of this class of phenomena as the most incontestable proof of universal gravitation, and showed that according to its law just such periodic fluctuations in the fluid covering of the earth must take place as are actually exhibited by the tides of the ocean.—The popular explanation of the tides as depending on the law of gravitation is sufficiently simple, although the complete mathematical investigation of the subject by which we should be enabled to predict their occurrence and magnitude for any place is encompassed with difficulties, from causes to which we shall hereafter revert. If we conceive the earth to be wholly, or in a great degree, covered with water, and subject to the attraction of the sun, the force of which is inversely as the square of the distance, it will be obvious, that while the whole earth will fall toward the sun with a velocity proportioned to the aggregate attraction upon its solid portions (which is the same as if all the matter were collected at its centre), the water nearest to the sun, being accelerated by a greater force, and being fluid, will approach the sun more rapidly than the solid core. It will thus run from all sides into a protuberance beyond the form of equilibrium of the earth's attraction and rotation, until the pressure of the elevated mass equals the difference in the attraction of the sun. Moreover, a similar protuberance will be formed on the side opposite to the sun, since the particles of water, being solicited by a less force than the solid core, will fall more slowly toward the sun, and as it were remain behind. Nor does the fact that, on the average, the earth does not lessen its distance from the sun, in the least invalidate the force of this reasoning; for the deviations from the tangential motion of the earth in its orbit are precisely those which the earth would move through if falling toward the sun unaffected by any other impulse. The same considerations hold good in regard to the attraction of the moon upon the earth and the waters surrounding it; for although we are in the habit of considering the moon as simply revolving about the earth, it must be remembered that the attraction is mutual, that both bodies describe orbits about their common centre of gravity, and that while the moon obeys the attractive force of the earth, the latter equally follows that of the former, by which it is at every instant of time drawn from the path which it would pursue if that influence did not exist, by an amount precisely equal to the fall corresponding to the moon's attractive force. As a necessary consequence of the elevation of the water in the regions nearest to and most remote from the attracting body, there must be a corresponding depression below the mean level of the sea at points distant 90° from the vertices of the protuberances, or at the sides of the earth as seen from the sun or moon. If the latter bodies maintained a constant position with respect to the earth, the effect would therefore be to produce a distortion of figure in the ocean surface (assumed to cover the whole earth) having the form of a slightly elongated ellipsoid, the two vertices of which would be, the one precisely under, the other precisely opposite to the points at which the disturbing body is vertical. This, however, is not the case; for by the rotation of the earth, and the motion of earth and moon in their orbits, the direction of the disturbing forces is constantly changing with respect to any point on the earth's surface. New points arrive at every instant under the zenith and nadir of either luminary, and thus it is that waves are produced which follow them round the globe. The highest points of these waves will remain far behind the verticals of the disturbing bodies, because the inertia and friction of the water prevent the rapid change of form required, and because, although the elevating force is greatest under the vertical, it still continues to act in the same direction for some hours after the passage of the luminary, with but little diminished force. This retardation, which would be sensible under the simple supposition of an uninterrupted ocean covering the earth's surface, becomes very considerable under the actual circumstances of the case.—The depth of the sea varies so much, and the form of its basin, taken as a whole, is so interrupted by the land, that it may be doubted whether, were the action of the sun and moon at once suspended, their tide waves would perform even a single revolution with any sort of regularity, and in the course of two or three would be so broken up and confused by reflection to and fro, as to destroy all vestige of a tide. Hence it follows, that the tides for the time being may be considered as almost completely commanded by the then actual positions and proximities of the sun and moon, the free oscillations of the sea in its bed being quite subordinate to the forced wave generating them. In consequence (as is always the case in forced oscillations), every periodicity in the action of the forcing cause is propagated into the oscillations, and records itself in the recorded height of the tide on every point of the coast, but at each point at a greater or less interval from the culmination of the sun or moon, according to its local position and the more or less circuitous course taken by the tide wave to reach it, and which special observation can alone determine. This interval is called the establishment of the place. The close relation which the times of high water bear to the times of the moon's passage, shows that the moon's influence in raising the tides must be much greater than the sun's. In fact, while the whole attraction of the sun upon the earth far exceeds that of the moon, yet owing to the greater proximity of the latter, the difference between its attraction at the centre of the earth and at the nearest or most remote points of its surface, which produces the tides, is about 2½ times as great as the difference of the sun's attraction at the same points.—We will now consider the particular phases resulting from the combination of the lunar and solar tides and from the varying positions of those luminaries. There will be two complete lunar tides in every lunar day of 24h. 54m., and also two complete solar tides in every mean solar day. These are known as the semi-diurnal tides, and constitute the principal fluctuations of the sea level. When the sun and moon are in conjunction or opposition, at the time of new or full moon, the effects of both combine to produce the spring tides, when high water is higher and low water is lower than at mean tides by the amount of the solar tide. At quadratures the high water of the sun will combine with the low water of the moon to produce a less fall, and the low water of the sun with the high water of the moon to produce a less rise, than at mean tides; and we have the neap tides, the range of which is less than the mean range by the amount of the solar tide. Thus, at New York, the rise and fall at syzygies is 5.4 feet, at quadrature 3.4 feet, the former being the sum, the latter the difference of the lunar and solar tides; whence we obtain for the effect of the moon 4.4 feet, and for that of the sun 1 foot, or a ratio of 44 to 10. This proportion does not prove to be the same in all parts of the world, and even varies considerably in places not far distant from each other. At Boston the heights are 11.3 and 8.5 feet respectively, giving a proportion of 7 to 1. On the Atlantic coast of the United States it averages about 5 to 1, while on the E. side of the Atlantic ocean, on the coasts of France and England, it is in many parts 3 to 1. These differences are to be ascribed to the fact that the shore and harbor tides which we observe have in every instance acquired a greater magnitude than the ocean tides, in consequence of the tide having passed over a sloping bottom, by which the solar and lunar tides, being of different depths, are altered in different degrees. A comparison of the range of spring and neap tides will not serve, therefore, as a correct measure of the relative effect of the sun and moon, and hence for a determination of the mass of the moon, unless they could be observed in mid-ocean. In the North Atlantic the highest tides are not observed immediately after the syzygies, but a day and a half or two days afterward. At New York, the high water which we observe about 8 o'clock in the evening on the days of full or change are those due to the meridian transit of the moon (and sun) on the preceding day, and the highest tide will not occur until the evening of the following day. At Boston, this delay, which is called the retard, or age of the tide, is nearly 36 hours. It is the same at Brest, and the tide wave occupies 10 hours in travelling from Brest up the English channel and Thames to London, making the age of the tide at the latter place 46 hours. This delay, which even at the Cape of Good Hope amounts to 14 hours, is still the subject of investigation, and is probably mainly due to friction. The interval between the moon's passage over the meridian of a place and the time of high water, which we have referred to as the establishment of the port, is also called the luni-tidal interval. This interval is constant for each place so far as the lunar tide wave is concerned; but as the actual high water depends upon the combination of the lunar and solar tides, it is subject to a variation which is known as the half-monthly inequality in time. On the day after the spring tides the top of the solar tide wave will be nearly an hour in advance of that of the lunar tide wave, and the two waves will combine to make high water earlier than the moon's alone would bring it; hence the luni-tidal interval is shorter. It will continue to shorten until the moon's transit is later by 3 hours than when the tide is greatest; it then increases again, passes its mean value when the moon has fallen behind 6 hours, attains its maximum when it is 9 hours later, and again decreases until at the next spring tides it reaches its mean value. The mean of all the luni-tidal intervals for half a month at a port is called its mean or corrected establishment, to distinguish it from the vulgar establishment, which is the luni-tidal interval at full and change. The former is now generally used for finding the time of high water on any given day, and tables are constructed from observations at the principal ports for finding the correction for semi-monthly inequality due to the moon's age. Thus for New York the corrected establishment or mean luni-tidal interval is 8h. 13m., and its least and greatest values are 7h. 52m. and 8h. 35m. On the Atlantic coast of the United States the range of this inequality is about ¾ of an hour; on the coasts of France and Great Britain it often exceeds 1½ hours. This difference of the half-monthly inequality in time at different places is analogous to the variation in the proportion of spring and neap tides above noticed, and is due to the same causes, the nature of which we have indicated, but which are not yet fully understood.—The next variation of the tides to be considered is that dependent on the moon's declination. Were she constantly in the plane of the equator, the highest points of the tide waves would also be in that plane, and would consequently produce a series of equal tides at any place either N. or S. of the equator. But it is evident that when she ascends to the north, the vertex of the tide wave will tend to follow her, giving the highest point of one tide in the northern, and the highest point of the opposite tide in the southern hemisphere. Consequently, when the moon has a northern declination, the tide at any place in the northern hemisphere caused by her upper transit will be higher than that caused by the lower transit. This variation in the heights has a period of one lunar day, and is called the diurnal inequality; it reaches its maximum when the moon is at its greatest northern or southern declination, and disappears when it is on the equator, and consequently has a half-monthly period. The variations of height from this cause produce a corresponding inequality in the times of high water. The sun's declination affects the tides in a similar manner, but the amount of the disturbance is very small, and its period extends over half a year. In long series of observations its effect is nevertheless well marked, both in height and time. The diurnal inequality depending on the moon's declination is on the other hand quite sensible, and in many places constitutes a prominent or even the chief feature of the tides, as on the Pacific coast of North America and in the gulf of Mexico, to the peculiarities of which we shall recur hereafter. If the tides arrive at the same place by two different channels, and one of them is retarded behind the other by 6 hours, in consequence of travelling a longer route or in shallower water, the semi-diurnal tides will be destroyed by an interference of the waves, that is, by the high water of one being superimposed on the low water of the other; the diurnal inequality, however, will not be destroyed, but merely modified in height and time, leaving a single tide in the lunar day outstanding, which is always very small in amount. A further cause of variation in the height of the tides is the variation of the distances of the sun and moon, by reason of the ellipticity of their orbits. The efficacy of a heavenly body in raising tides is shown by theory to be inversely proportional to the cube of the distance. Hence the efficacy of the sun will fluctuate between the extremes 19 and 21, taking 20 for its mean value, and that of the moon between 43 and 59. Taking into account this cause of difference, the highest spring tide will be to the lowest neap as 59 + 21 to 43—19, or as 80 to 24, or 10 to 3; leaving out of consideration the local circumstances of access and depth, which, as we have stated, modify those proportions in a marked degree.—The motion of the water in the tide wave is totally unlike that in an ordinary surface wave, such as the wind produces. When a narrow wave of the latter kind, or a succession of such waves of equal breadths and heights, is formed in deep water, a light floating body, as a cork, revolves either in a vertical circle or an ellipse not very different from one, having the longer axis vertical. But in the tide wave the movement of each particle may be regarded as performed in an excessively elongated ellipse, the shorter axis of which is vertical. The breadth of the tide wave from crest to crest, supposing all the earth covered, would be half the earth's circumference, or 12,500 miles, in comparison with which the depth of the sea is insignificant; and the slightest consideration suffices to show that, as all the water which goes to form the elevated portion must be brought from that depressed, this can only take place by a lateral approach of the vertical sections of the sea when the water is rising, and their recess from each other when falling—*i. e.*, over a quadrant of the globe in either case, which is only another way of expressing an alternating backward and forward horizontal current at any given place—with this peculiarity, that these currents (the flow and ebb current) run most rapidly at the moments of high and low water; the instants of most rapid rise and fall being those of slack water or no current one way or the other. In fact, it is obvious that the surface must be rising most rapidly when the water is setting in equally both ways to, and sinking most rapidly when setting out equally both ways from the place; in neither of which cases can there be any current at the place. The tide wave differs also from a wind wave in another very remarkable point. It affects the whole depth of the ocean equally, from the bottom to the surface, while the wind waves, even in the most violent storms, agitate it to a very trifling depth; for the force which acts to produce the former is exerted equally in every portion of the vertical extent of the water, while those producing the latter are strictly confined to the surface. A tide wave of 4 feet in total height (between high and low water), which is that of the tide at the atolls of the Indian ocean, advancing over a sea 30,000 feet deep, implies in each particle an alternate advance and recess of 2,800 feet in its total extent; but this movement, being spread over 6 hours either way, is nowhere very rapid. Where a bay or indentation of the coast presents its opening favorably to the tide wave, and decreases in width from the entrance toward its head, the tides rise higher and higher from the mouth upward. This is due to the concentration of the wave by the approach of the shores, and to the gradual shoaling of the bottom by which a portion of the horizontal motion is transferred into vertical motion, the velocity of the wave being at the same time retarded. This effect is strikingly illustrated by a generalization of the heights of the tides on the Atlantic coast of the United States, developed from the tidal observations made in connection with the United States coast survey. That coast presents in its general outline three large bays: the great southern, from Cape Florida to Cape Hatteras; the great middle, from Cape Hatteras to Siasconset, Nantucket; and the great eastern, from Siasconset to Cape Sable. Referring to the tide table given below, we find at Cape Florida a mean height of 1.5 feet, and as we follow the coast to the northward a gradually increasing height, reaching 7 feet at Savannah entrance, then decreasing again, with an exception easily explained, to Cape Hatteras, where it is 2 feet. In the middle bay, following the stations on the coast, and omitting those on the bays and sounds, we have a less regular increase to 4.8 feet at Sandy Hook, and a decrease to 2.7 feet at Menemsha bight on Nantucket island. The configuration of the eastern bay is less regular, and the correspondence of heights requires closer examination. The recess of Massachusetts bay is well marked by the increase in height, reaching 10 feet at Boston and Plymouth; but the most striking effect of the convergence of shores and shoaling is exhibited in the bay of Fundy. On a line across its mouth, at the Kennebec river as at Cape Sable, the mean height of tide is 8 feet, while at St. John's, N. B., it rises 19 feet, and at Sackville in Cumberland basin, at the head of the bay, to 36 feet, attaining to 50 feet and more at spring tides. When the wave leaves the open sea, its front slope and its rear slope are equal in length and similar in form. But as it advances into a narrow channel, bay, or river, its front slope becomes short and steep, and its rear slope becomes long and gentle. Hence arise the circumstances noticed in the early part of this article, and illustrated by reference to the Chesapeake bay. At the station near the sea the time occupied by the rise is equal to that occupied by the descent; but at a station more removed from the sea the rise occupies a shorter time than the descent. When the tide is very large compared with the depth of water, this inequality becomes very great; thus in the Severn river, at Newnham, above Bristol (England), the whole rise of 18 feet takes place in 1½ hours, while the fall occupies 10 hours. As the wave advances over a shoaling bottom, a portion of the horizontal motion is transformed into vertical motion, by which the height of the wave is increased, the most rapid current approaches the greatest rise, and the interval between the stand and slack water is diminished. This exaggeration of the height and current is particularly remarkable whenever the front of the advancing tide wave stretches across the mouth of an estuary with contracting borders, and extensive flats bordering the channel near low water level; then it produces a bore, or sudden and violent wave of great height, which rushes forward with such impetuosity as to sweep every thing before it. Such is the case at the head of the bay of Fundy; likewise in the Hoogly river, in the bay of Bengal; in the Dordogne, where it empties into the Garonne, on the coast of France; and in the Severn river, where at spring tides a bore of 9 feet in height rushes up stream. In the river Amazon, at the equinoxes (when the equatorial tide is at its maximum), during 3 consecutive days bores of 12 or 15 feet high rush up the river with each high water; so that along the course of the stream, up which for 200 m. from its mouth no fewer than 8 tide waves are simultaneously advancing, as many as 5 bores are sometimes at once in progress. It is easily seen that in seas of small extent, which have little or no communication with the ocean, as the Mediterranean, Black, and Caspian seas, and the North American lakes, the tides must be insensible, as the attraction of the moon is at all times very nearly the same for all parts of them. Near the E. end of the Mediterranean, as at Malaga, a small tide is observable, being propagated from the Atlantic ocean through the straits of Gibraltar. Tides are also observable at Venice, but the observations have not been discussed so as to determine whether they arise from a small tide wave proper to the Mediterranean, magnified by travelling up the Adriatic sea, although insensible at its mouth, or whether they are variations due to the winds. Fluctuations of the sea level resembling those of the tides, and causing irregularities in the latter, are often produced by the winds, which in many places have a certain periodicity in their direction and force, as the land and sea breezes in the tropics. They come under consideration here only as complicating the study of the tidal phenomena.—We have now shown in a general way, as far as can well be done without the use of mathematical forms of reasoning, the nature of the forces which produce the phenomena described at the outset, and their mode of action. The existing theories, while they suffice for the explanation of the observed facts, are inadequate, as we have stated, to the prediction of the phenomena at places where they have not been observed. This arises not from any defect in the principles upon which the theory is based, but from the difficulty of investigating mathematically the motion of fluids, under all the various circumstances in which the waters of the sea and of rivers are found, and from our ignorance of the configuration of the bottom of the sea. The equatorial sea being broken up into three great basins, and open water existing only to the southward of the three great continents, the tides are complicated in a singular way. In each of these basins the equatorial tide has to take a fresh start from the eastern side with every fresh upper and lower transit of the moon and sun, and is destroyed or confused by reflection on the western coast before the creation of a new wave; while in the open part of the southern ocean the tide wave circulates unimpeded, and spreads into the three oceans up which it runs as a free wave, from S. E. to N. W., overtaking its progress and compounding with the partial equatorial tides or forced waves proper to either ocean. On approaching the shore, the waves are elevated and retarded by the slope of the bottom, and deflected or crowded together according to the varied configurations of the coasts. It is owing to these complications, together with our ignorance of the laws of friction among the particles of water, and between the water and the bottom, that our theories fail to inform us of the magnitude and time of the tides at any given place. But they determine the periodicity of their phases, and the relative part which each disturbing force bears to the whole, by which we are enabled, by the analysis of a sufficient series of exact observations at any place, to predict the phases of the tides at the same place for any future time, the knowledge of which is of immense importance to navigation. It is only since the beginning of the present century that the science of the tides has made any considerable progress in this direction. The theoretical investigations of Laplace, in the *Mécanique céleste*, and his discussions of the tidal observations at Brest, opened the way. Mr. Lubbock and Prof. Whewell contributed largely by the elaborate discussions of large collections of tidal observations, published in the "Philosophical Transactions" of the royal society; and Prof. Airy, in his admirable essay on "Tides and Waves," in the "Encyclopædia Metropolitana," has greatly extended our theoretical conceptions of the subject. —The tides on the coasts of the United States have been specially investigated by Prof. Bache, superintendent of the American coast survey. In connection with that work he organized an extensive system of exact tidal observations, for the purpose of ascertaining the complicated laws which govern the tides of the seas that wash our shores. It will be readily understood that in order to separate the effects of the different causes which modify the phenomena, it is not sufficient to observe merely the heights and times of high and low water, but that a continuous record of the tides is necessary, as the inequalities are constantly shifting their place and magnitude. For this purpose a self-registering tide gauge is used, by which a continuous curve representing the successive changes in the height of water is traced on paper moved by clockwork, by a pencil acted on by the rising and falling of a float in a vertical box, to which the tide has free access. The time scale is such that every hour is represented by one inch, and is pricked into the paper by points on the cylinder which moves the paper forward. The scale of heights is so adapted to the range of the tide at the place of observation, that the extreme range of the curve will not exceed the width of the sheet, 12 inches. A continuous sheet, sufficient for the record of a whole month, is put on the tide gauge at one time. A complete description of this instrument will be found in the coast survey report for 1853. Prof. Bache has given in his annual reports on the progress of the coast survey, from 1851 forward, a series of papers on the tides, detailing the processes of discussion, and giving the results as they were from time to time developed. The apparent anomalies in the tides in the gulf of Mexico, exhibiting at some places only one tide in 24 hours; the large inequalities in the tides on the Pacific coast; the general progress of the tide wave along our coasts and in the bays and rivers; the influence of the winds in particular localities; and the action of tidal currents on the bars and channels of our harbors, are discussed there. These labors, which are still in progress, have resulted already in tide tables for the use of navigators, by which any one is enabled, with the aid of the moon's place from the "Nautical Almanac," to find the stage of the tide at the places named in the table for any given time. Below is an extract from these tables, giving the mean luni-tidal interval, and the rise and fall, or range at spring and neap tides. The full tables give, beside, the difference between greatest and least interval, the mean rise and fall, and the duration of flood, ebb, and stand. There are, moreover, supplementary tables for finding the actual luni-tidal interval and height on a given day, as affected by the half-monthly inequality, and rules and tables for finding the effect of the diurnal inequality, all arranged in a manner easy of comprehension and convenient for use. From the explanations accompanying these tables we learn that the tides on the coast of the United States, on the Atlantic, gulf of Mexico, and Pacific, are of three different classes. Those of the Atlantic are of the most ordinary type, ebbing and flowing twice in 24 hours, and having but moderate differences in height between the two successive high or low waters, one occurring before noon, the other after noon. Those of the Pacific coast also ebb and flow twice during 24 hours, but the morning and afternoon tides differ very considerably in height, so much so that at certain periods a rock which has 8½ feet of water upon it at low tide may be awash (nearly bare) on the next succeeding low water. The intervals, too, between successive high and successive low waters may be very unequal. At San Francisco, for example, at a time when the moon has a large southern declination, the high water occurring about 12 hours after the moon's transit may mark 5 feet on a tide staff; 5 hours afterward low water will mark 3½ feet, 6 hours after which the second high water will reach 7½ feet, and 7 hours later the second low water will fall to zero. The inequalities depend upon the moon's declination, in the manner which we have explained; they disappear at the time of the moon's declination being nothing, and are greatest about the time of its being greatest. In the gulf of Mexico, from Cape Florida around the peninsula to St. Mark's, the tides are of the ordinary kind, but with a daily inequality which, small at Cape Florida, goes on increasing westward to the Tortugas. From the Tortugas to St. Mark's the tides have a great resemblance to those of the Pacific coast, though the rise and fall is much smaller. From Cape St. Blas to the Mississippi the tides ebb and flow very regularly only once in 24 hours (single day tides); the small and irregular double tides appear only for 2 or 3 days about the time of zero declination of the moon. To the westward of the Mississippi the mixed type prevails again, and the tides are very small, ranging from 1 to 2½ feet. As the entrances to the ports in that region are for the most part very shallow, a knowledge of these small variations in depth is of no less importance than of the larger tides in the northern ports.

TIDE TABLE FOR THE UNITED STATES.*

Ports.	Mean lunitidal interval.	Rise and fall, spring tides.	Rise and fall, neap tides.	Ports.	Mean lunitidal interval.	Rise and fall, spring tides.	Rise and fall, neap tides.
	h. m.	feet.	feet.		h. m.	feet.	feet.
Hanniwell's Point, Kennebec river, Me.	11 15	9.8	7.0	Mahon's river, Del.	9 52	6.9	5.0
Portland, Me.	11 25	9.9	7.6	Newcastle, "	11 58	6.9	6.6
Portsmouth, N. H.	11 28	9.9	7.2	Philadelphia, Penn.	18 44	6.8	5.1
Newburyport, Mass.	11 22	9.1	6.6	Old Point Comfort, Va.	8 17	8.0	2.0
Rockport, "	10 57	10.2	7.1	Point Lookout, Md.	12 58	1.9	0.7
Salem, "	11 18	10.6	7.6	Annapolis, "	17 4	1.0	0.8
Boston light, "	11 12	10.9	8.1	Bodkin light, "	18 8	1.8	0.8
Boston, "	11 27	11.8	8.5	Baltimore, "	18 59	1.5	0.9
Plymouth, "	11 19	11.4	9.0	Washington, D. C.	20 10	8.4	2.6
Wellfleet, "	11 5	18.2	9.2	James river (City Point), Va.	14 87	8.0	2.5
Provincetown, "	11 22	10.8	7.7	Richmond, "	16 54	8.4	2.8
Monomoy, "	11 58	5.8	2.6	Tappahannock, "	12 58	1.9	1.8
Nantucket, "	12 24	8.6	2.6	Hatteras inlet, N. C.	7 4	2.2	1.8
Hyannis, "	12 22	8.9	1.8	Beaufort, "	7 26	8.8	2.2
Edgartown, "	12 16	2.5	1.6	Bald Head, "	7 26	5.0	8.4
Holmes's Hole, "	11 48	1.8	1.8	Smithville, "	7 19	5.5	8.8
Tarpaulin Cove, "	8 4	2.8	1.8	Wilmington, "	9 6	8.1	2.2
Wood's Hole, N. side, Mass.	7 59	4.7	8.1	Georgetown entrance, S. C.	7 56	4.7	2.7
Wood's Hole, S. side, "	8 84	2.0	1.2	Bull's island bay, "	7 16	5.7	8.7
Menemsha Bight, "	7 45	8.9	1.6	Charleston, "	7 26	6.0	4.1
Quick's Hole, N. side, "	7 81	4.8	2.9	St. Helena sound, "	7 8	7.4	4.4
Quick's Hole, S. side, "	7 86	8.8	2.8	Fort Pulaski, Ga.	7 20	8.0	5.9
Cuttyhunk, "	7 40	4.2	2.9	Savannah, "	8 18	7.0	5.5
Kettle Cove, "	7 48	5.0	8.7	Doboy lighthouse, Ga.	7 88	7.8	5.4
Bird island light, "	7 59	5.8	8.5	St. Simon's, "	7 48	8.2	5.4
New Bedford entrance, "	7 57	4.6	2.8	Fort Clinch, Fla.	7 58	6.7	5.8
Newport, R. I.	7 45	4.6	8.1	St. John's river, Fla.	7 28	5.5	8.7
Point Judith, R. I.	7 82	8.7	2.6	St. Augustine, "	8 21	4.9	8.6
Block island, "	7 86	8.5	2.0	Cape Florida, "	8 84	1.8	1.2
Montauk Point, L. I., N. Y.	8 20	2.4	1.6	Indian Key, "	8 23	2.2	1.8
Sandy Hook, "	7 29	5.6	4.0	Sand Key, "	8 40	2.0	0.6
New York, "	8 18	5.4	8.4	Key West, "	9 80	1.5	0.9
Dobb's Ferry, Hudson river, N. Y.	9 19	4.4	2.7	Tortugas, "	9 56	1.5	0.6
Tarrytown, " "	9 57	4.0	2.7	Tampa bay (Egmont Key), Fla.	11 21	1.8	1.0
Verplanck's Point, " "	10 8	8.8	2.5	Cedar Keys (Depot Key), "	18 15	8.2	1.6
West Point, " "	11 2	8.2	2.0	St. Mark's, "	18 88	2.9	1.4
Poughkeepsie, " "	12 84	8.9	2.4				
Tivoli, " "	18 50	4.6	8.2	WESTERN COAST.			
Stuyvesant, " "	15 49	4.4	8.0	San Diego, Cal.	9 88	5.0	2.8
Castleton, " "	16 55	8.0	2.8	San Pedro, "	9 89	4.7	2.2
Greenbush, " "	17 48	2.5	1.9	Cuyler's harbor, Cal.	9 25	5.1	2.8
Watch Hill, R. I.	9 0	8.1	2.4	San Luis Obispo, "	10 8	4.8	2.4
Stonington, Conn.	9 7	8.2	2.2	Monterey, "	10 22	4.8	2.5
Little Gull island, N. Y.	9 88	2.9	2.8	South Farallone, "	10 87	4.4	2.8
New London, Conn.	9 28	8.1	2.1	San Francisco, "	12 6	4.8	2.8
New Haven, "	11 16	6.2	5.2	Mare island, "	18 40	5.2	4.1
Bridgeport, "	11 11	8.0	4.7	Benicia, "	14 10	5.1	8.7
Oyster Bay, L. I., N. Y.	11 7	9.2	5.4	Ravenswood, "	12 36	7.8	4.9
Sand's Point, " "	11 18	8.9	6.4	Bodega, "	11 17	4.7	2.7
New Rochelle, N. Y.	11 22	8.6	6.6	Humboldt bay, "	12 2	5.5	8.5
Throg's Neck, "	11 20	9.2	6.1	Port Orford, Oregon	11 26	6.8	8.7
Cold Spring inlet, N. J.	7 82	5.4	8.6	Astoria, "	12 42	7.4	4.6
Cape May landing, "	8 19	6.0	4.8	Neeah harbor, Washington territory	12 88	7.4	4.8
Delaware breakwater, Del.	8 0	4.5	8.0	Port Townshend, " "	8 49	5.5	4.0
Higbee's, Cape May, N. J.	8 88	6.2	8.9	Steilacoom, " "	4 46	11.1	7.2
Egg island light, "	9 4	7.0	5.1	Semi-ah-moo bay, " "	4 50	6.6	4.8

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* The mean interval in column 2 has been increased by 12h. 27m. (half a mean lunar day) for some of the ports in Hudson river, Delaware river, and Chesapeake bay, so as to show the succession of times from the mouth. For ports in the gulf of Mexico W. of St. Mark's, see remarks preceding this table.

TIDE TABLE FOR SOME OF THE PRINCIPAL PORTS AND HEADLANDS OF THE WORLD, giving the vulgar establishment or time of high water at full and change, and the rise and fall or whole range at spring and neap tides, except for the United States.

Places.	Time of H. W. at full and change.	Range at spring tides.	Range at neap tides.
EAST COAST OF ATLANTIC OCEAN.	h. m.	feet.	feet.
Simon's bay, Cape of Good Hope....	2 44	5½	2½
St. Helena island..........	3 11	3	1½
St. Paul de Loanda, Africa..........	4 30	5	..
Sierra Leone, "	7 55	8	..
Cape Verd, "	7 45	5	..
Ceuta, straits of Gibraltar..........	2 6	3½	1½
Gibraltar, old mole..........	2 20	3½	..
Fayal, Azores..........	11 45	4	..
Cape Finisterre, Portugal..........	3 0	15	..
Bordeaux, France..........	6 50	14	11½
Brest, "	3 47	19	8½
St. Malo, "	6 5	35	17
Cherbourg, "	7 49	17	8½
Havre, "	9 51	22	14
Calais, "	11 49	19½	11½
Dover, England..........	11 12	18¾	11½
Portsmouth dockyard, England.....	11 41	12½	7½
Plymouth breakwater, "	5 37	15½	7½
Scilly isles, St. Agnes, "	4 30	16	8
Bristol (King road), "	6 65	44	22
Liverpool, "	11 23	26	14½
Glasgow, Scotland..........	1 25	9	6
Stromness, "	9 0	10	5
Aberdeen, "	1 0	12	8
Leith, "	2 17	16½	9
Hull, England..........	6 29	20½	11½
Yarmouth roads, England..........	9 15	6	2
Margate, "	11 40	15½	10½
London docks, "	1 57	19½	14½
Cape Clear, Ireland..........	4 0	9	4
Cork (Penrose quay), Ireland..........	4 58	12½	7½
Dublin bar, "	11 12	12–14	7–9
Galway, "	4 35	14½	7½
Ostend, Belgium..........	12 25	19	11
Texel (outside shoals), Holland..........	6 30	4	3
Helgoland, Elbe entrance..........	11 33	9½	4½
Loffoden islands, Norway..........	12 0	9	6
Keret's point, gulf of Archangel......	4 30	5½	..
WEST COAST OF ATLANTIC OCEAN.			
Cape Horn islands, South America...	3 50	8	..
Santa Cruz river, " " ..	9 30	40	18
Rio Janeiro, " " ..	3 0	4	2
Cape St. Roque, " " ..	..	8–10	..
Maranham, South America..........	7 0	17½	..
Cartagena, " "	11 0	1½	½
Cape St. Antonio, Cuba..........	..	1½	..
Bermudas, dockyard..........	7 14	4	..
Greytown, Nicaragua..........	9 0	1½	..
Vera Cruz, Mexico..........	..	2	..
Cape Sable, Nova Scotia..........	8 30	9	4
St. John's, New Brunswick..........	11 23	23	17
Sackville, "	11 48	50	24
Halifax harbor, Nova Scotia..........	7 49	6	2
Quebec, Canada..........	6 33	18	8
St. John's, Newfoundland..........	7 30	7	..
Upernavik, Greenland..........	11 0	8	..
Van Rensselaer bay, Greenland......	11 50	11	4½
INDIAN OCEAN AND EAST COAST OF PACIFIC.			
Mozambique harbor, Africa..........	4 15	12	..
Bab-el-Mandeb, Red sea..........	12 30	..	..
Suez bay, head of gulf, Red sea......	2 0	6	..
Surat, Hindostan..........	4 0	19	..
Bombay, dockyard, Hindostan......	11 40	12–17	..
Maldives, Adou atoll..........	1 0	4	..
Trincomalee harbor, Ceylon..........	8 18	2	1
Madras road, Hindostan..........	7 34	3½	..
Western entrance to Hoogly river...	10 0	10½	..
Singapore, new harbor..........	9 45	10	5
Batavia, Java..........	10 0	2	..
Canton river (entrance), China......	10 0	8	..
Yang-tse-kiang (entrance), China....	12 0	15	5
Nagasaki bay, Japan..........	6 23	6½	..
Sydney, Australia..........	8 33	4½	3½
Melbourne, "	1 20	3	..
Tahiti or Otaheite island..........	noon	1	..
Honolulu, Sandwich islands..........	4 0	2	..
WEST COAST OF PACIFIC OCEAN.			
Cape Virgin, strait of Magellan......	8 30	36–42	..
Cape Horn..........	4 40	9	..
Valparaiso, Chili..........	9 32	5	..
Callao bay, Peru..........	5 47	4	..
Guayaquil, Ecuador..........	7 0	11	..
Panama road, New Granada..........	3 23	15–22	5–10
Port la Union, gulf of Fonseca..........	3 15	10½	6½
Mazatlan, Mexico..........	9 40	7	..

A study of the preceding tables, with the aid of a map, will develop many interesting facts with regard to the propagation of the tide wave and the effect of the configuration of the coasts on the time and height of the tides. It will be seen, for example, that high water occurs nearly at the same time at the headlands of the great middle and eastern bays of the Atlantic coast of the United States—at Cape Hatteras, Nantucket island, and Cape Sable—making an allowance for the difference in local time. If by a line on the map we connect these points at which high water occurs simultaneously, we may regard that line as representing the crest of a tide wave advancing upon the coast. We shall find high water to occur later and later as we go up into the bays and rivers; and by following up the progress of the waves, we may be enabled to draw lines representing the time of high water or the top of the wave for each successive hour. Such lines are called co-tidal lines, and have been traced for the coasts of the United States by Prof. Bache, for which we again refer to the coast survey reports. A chart of co-tidal lines for the British isles, by Prof. Whewell, will be found in Keith Johnston's "Physical Atlas," as well as a chart of co-tidal lines for the whole globe; the latter must, however, be looked upon as a rather adventurous generalization, in the absence of any positive knowledge of the tides in mid-ocean. The tides about the British isles present a very interesting study. The advancing high water passes up the British channel, occupying 6 hours from the Scilly isles to the mouth of the Thames, where it is met and reënforced by the high water 12 hours older, which has travelled around the isles to the northward and down the German sea. There is a point in the latter, about midway between Yarmouth and the Texel, where the co-tidal line of 9 hours of the latter tide wave intersects that of 3 hours of the former, causing the interference of low water of the one with high water of the other tide, in consequence of which no change takes place in the sea level, as has been ascertained by actual observations over a shoal spot in that locality. A remarkable case of the meeting of two tides occurs near Throg's Neck at the W. end of Long Island sound. The tide wave of the Atlantic enters the sound between Point Judith and Montauk point, and travels westward through the sound, a distance of about 120 miles, in 3½ hours to Sand's Point or Throg's Neck, where it is met by the tide which entered New York bay off Sandy Hook, about the same time that the former was off Point Judith, and which has advanced but 40 miles in the same time. This remarkably slow transmission of the wave is due to the narrowness and intricacies of the channel through the East river, and especially in Hell Gate, where the tidal current frequently attains a velocity of 6 miles an hour, producing powerful eddies in the angles of the narrow passages, and constituting a noted and much dreaded danger in the navigation of the sound. The removal by blasting of one of the principal rocks obstructing the channel has greatly diminished the danger of the passage. At Montauk the mean range of the tide is 2 feet, at Sandy Hook 4.8 feet; the greatest mean range observed is one foot more than the sum, being 7.8 feet at Sand's Point, which increase is due to the contraction of the channel.—The agency of tidal currents in producing changes in the entrances of bays and harbors is a subject of the first importance to commerce and navigation, which has received full attention in the prosecution of the American coast survey. The laws according to which the changes take place require to be studied by long continued observation, and when the change is for the worse, the means of counteracting it must be pointed out. As on the average the same amount of water moves inward and outward with the flood and ebb tides, we might readily suppose that the same amount of material is transported either way, and that no important change would take place in the configuration of the bottom. But the operation of the flood stream is very different from that of the ebb stream. We have as a general feature an interior basin of some extent communicating with the sea by a comparatively narrow passage. The flood stream, therefore, running with considerable velocity through this channel, will as it enters the basin spread out and become slow, depositing the sand and mud it is charged with, and making extensive flats or shoals opposite the entrance. The ebb stream runs slowly over the flats from all directions toward the opening, without removing much of the deposit, and gradually concentrates in definite narrow channels, which it scoops out, and the depth of which will depend in a great degree on the proportion of the area of the basin to the outlet, or, in other terms, on the difference of level which will be reached during the ebb between the basin and the ocean, which determines the greatest velocity and transporting power reached by the ebb stream. Among the most notable and important instances of the effect of tidal currents upon harbors is the advance of Sandy Hook upon the main ship channel into New York bay. Within a century it has increased a mile and a quarter, and at about the rate of $\frac{1}{16}$ of a mile per year in 12 years since 1844. A point where 10 years before there was 40 feet of water, was then nearly bare at low water. The cause of this growth is a remarkable northwardly current along both shores of the Hook, running both during the flood and ebb tides, with varying rates, and resulting from those tides directly and indirectly. A full discussion of this subject will be found in the coast survey reports for 1856 and 1858.

TIECK, Christian Friedrich, a German sculptor, born in Berlin, Aug. 14, 1776, died there, May 14, 1851. He studied under Schadow and David, and first brought himself into notice at Weimar, where in the early part of the present century he executed busts of Goethe, Voss, and other eminent literary men. During a subsequent residence in Italy he was much employed by Mme. de Staël and the crown prince, afterward King Louis of Bavaria, for the latter of whom he executed a series of busts of distinguished Germans for the Walhalla. In 1819 he established himself in Berlin, where he passed the remainder of his life. He participated in most of the important art enterprises undertaken in Berlin during the last 30 years of his life, and was particularly distinguished for his memorial busts. Among his principal works are the friezes, groups for the pediment, and other external decorations of the royal theatre, and a series of seated marble statues of classical personages for the royal palace. Kiss was his pupil.

TIECK, Ludwig, a German author, one of the founders of the romantic school, brother of the preceding, born in Berlin, May 31, 1773, died there, April 28, 1853. He was educated at the universities of Berlin, Halle, Göttingen, and Erlangen. Shakespeare and mediæval romance were already the chief objects of his admiration and study, and he had published several minor tales and tragedies, when in 1795 appeared his two fantastic novels *Abdallah* and *William Lovell*, the former a chivalric in the guise of an oriental romance, and the latter relating the career of a scornful and incomprehensible genius, superior to the ways and maxims of the world. His antagonism to the literary tendencies of the time was more effectively displayed in *Peter Lebrecht* (1796), and in his *Volksmärchen* (1797), several of which, as *Der gestiefelte Kater* ("Puss in Boots"), *Blaubart* ("Bluebeard"), and *Leben und Tod des kleinen Rothkäppchen* ("Life and Death of Little Red Riding Hood"), combine the simplicity of the old legends with grotesque satire upon modern subjects. The classicists were the special objects of his brilliant raillery. A more definite conception of his own poetic and romantic ideal appears in his succeeding works. The *Herzensergiessungen eines kunstliebenden Klosterbruders* (1797), the *Phantasien über die Kunst* (1799), both written in conjunction with Wackenroder, and the romance of *Franz Sternbald's Wanderungen* (1798), were panegyrics not only upon the art, but also the manners, literature, and faith of the middle ages. The comedies of *Die verkehrte Welt* ("The Topsy-Turvy World") and *Prinz Zerbino, oder die Reise nach dem guten Geschmack* ("Travels after Good Taste") abound in humorous and ironical invective against those who prefer the severity of Greek and French taste to the marvels and terrors of mediæval and oriental fancy. The *Leben und Tod der Genoveva* (1800), treating the legend of St. Genevieve, is esteemed his finest drama, though marked by the affectations and irregularity of his school. Meantime he had married at Hamburg a niece of the composer Reichardt, had become associated with the Schlegels, Novalis, and Steffens at Jena, and with Herder at Weimar, and was occupied with a translation of "Don Quixote" (4 vols., Berlin, 1799–1801). He published at Dresden in 1802, with A. W. von Schlegel, the *Musenalmanach*, collected in 1803 the *Minnelieder aus dem Schwäbischen Zeitalter*, to the prevalent admiration of which he had contributed more than any one else, and produced in 1804 the elaborate dramas of *Kaiser Octavianus* and *Fortunatus*. He now rested from composition, applied himself to the study of German mediæval literature, visited Rome to examine the MSS. in the Vatican, and after his return to Munich in 1806 suffered so severely from the gout that he was able to publish nothing for several years. He became intimate with Solger in 1811; collected and modified many of his previous pieces in *Phantasus* (3 vols., 1812–'15); produced the *Altenglisches Theater* (2 vols., 1811), containing translations of several plays of the age of Shakespeare, *Ulrichs von Lichtenstein Frauendienst* (1815), and 2 vols. of the *Altdeutsches Theater* (1817); travelled in England to prosecute Shakespearian studies in 1817, and is believed to have attained a more thorough acquaintance with Elizabethan literature than any other foreigner; and on his return took up his residence in Dresden and manifested a revolution in his literary taste. The most ardent promoter of German romanticism abandoned the cause of which he had been the prophet, and began to prefer historical to fantastic subjects, and strict rules of art to the caprices of mystical passion. A society of men of letters and artists gathered about him, whom he charmed by his conversational powers and his recitations of the best dramatic compositions, ancient and modern, which he is said to have rendered with an effect comparable to that produced by Talma. Beside tales for annuals, he published a collection of poems (3 vols., 1821); *Shakespeare's Vorschule* (2 vols., 1823–'9), consisting of translations of plays which, unlike other critics, he considers to have been probably early works of Shakespeare; and *Dramaturgische Blätter* (2 vols., 1826), containing admirable criticisms of Shakespearian and modern German dramas. His principal later novels, remarkable for their witty and suggestive dialogues on modern literature and life, are: *Der Aufruhr in den Cevennen* (1826), an unfinished romance of the insurrection in the Cévennes; *Des Dichters Leben* (1828), in which Shakespeare and some of his contemporaries are introduced; *Der Tod des Dichters* (1829), founded upon the fate of Camoëns; and *Vittoria Accorombona* (2 vols., 1840), the heroine of which is an adventurous Corinna under the pontificates of Gregory XIII. and Sixtus V. He and his daughter Dorothea assisted Schlegel in his translation of Shakespeare. In 1840 he was invited by Frederic William IV. to Berlin, where he was created privy councillor, and where, as at Dresden, he took an active part in the management of the theatres. By his influence the *Antigone* was successfully produced on the stage both at Berlin and Potsdam. He edited the posthumous works of Novalis (1802) in association with Friedrich von Schlegel, of Heinrich von Kleist (1826), of Solger (1826) with Friedrich von Raumer, and of Reinhardt Lenz (1828). He revised a collected but incomplete edition of his works (20 vols., Berlin, 1828–'42).

TIEDEMANN, Dietrich, a German philosopher, born at Bremervörde, April 3, 1748, died in Marburg, Sept. 24, 1803. At the university of Göttingen he began successively the courses in theology and jurisprudence, but abandoned each for classical literature and philosophy. He became in 1769 tutor in a nobleman's family, returned after 4 years to Göttingen, was recommended by Heyne to the professorship of ancient literature in the Carolinum at Cassel in 1776, and was transferred to the professorship of philosophy at Marburg in 1786. He published dissertations against the system of Kant, several treatises on special subjects in the history of Greek philosophy, *Untersuchungen über den Menschen* (3 vols., Leipsic, 1778), and *Geist der speculativen Philosophie* (6 vols., Marburg, 1791–'6), his principal work, tracing the history of philosophy from Thales to Wolf, which has not yet been entirely superseded.—Friedrich, a German anatomist and physiologist, son of the preceding, born in Cassel, Aug. 23, 1781. He was educated at Marburg, and became professor of anatomy and zoology at Landshut in 1805, and of comparative anatomy, physiology, and zoology at Heidelberg in 1816. The last position he held till 1849, declining invitations to Bonn and to Berlin; and has since lived in retirement at Frankfort-on-the-Main. He has published works on zoology (3 vols., 1808–'10); on the anatomy of the heart of fishes (1809), of the flying lizard or dragon (1811), and of headless monsters (1813); on the anatomy and history of the formation of the brain in the human fœtus (1816); on the structure of radiate animals (1820), which received a prize of 3,000 francs from the French institute; illustrated works on the nerves of the uterus (1822), on the arteries of the human body (1822), and on the brain of monkeys (1822); a treatise on digestion (2 vols., 1826–'7), in conjunction with Gmelin; on the physiology of man (1830 *et seq.*); on the opening and closing of the arteries in disease (1843); and on living worms and insects in the olfactory organs. With the brothers Treviranus he edited from 1824 to 1835 the *Zeitschrift für Physiologie*.—His son

Gustav Nikolaus took part in the Baden insurrection of 1849, was the commander of the fortress of Rastadt, and was condemned to death and shot, Aug. 11, 1849.

TIEDGE, **Christoph August**, a German poet, born at Gardelegen, in Brandenburg, Dec. 14, 1752, died in Dresden, March 8, 1841. He studied law at Halle, became a secretary in the administrative council at Magdeburg, and in 1781 went to Elrich as private tutor, where he was intimate with the poets Göcking, Gleim, Klamer Schmidt, and Elisa von der Recke. He accepted the invitation of Gleim to Halberstadt in 1788, where he resided till he became private secretary to the canon Von Stedern in 1792, in whose family he remained till 1799. At Berlin he renewed his intimacy with Elisa von der Recke, travelled with her through Germany, Switzerland, and Italy (1805–'8), and lived in her house at Berlin, and after 1819 at Dresden, till her death in 1833. By her will she ordered the same establishment to be kept up for him without change during the remainder of his life. His poems are chiefly didactic and elegiac, the most noteworthy being *Urania*, on the immortality of the soul. A complete edition was edited by Eberhard (8 vols., Halle, 1823–'9). See also Eberhard, *Blicke in Tiedge's und in Elisa's Leben* (Berlin, 1844).

TIEN-TE. See **China**, vol. v. p. 112.

TIEN-TSIN, **Teen-tsin**, or **Tien-sing**, a town of China, province of Chi-li, situated on level ground at the junction of the Pei-ho with the grand canal, 70 m. S. E. from Peking; pop. 500,000. It is surrounded by a wall about 4 m. in circuit, and entered by 4 gates, each surmounted by a watch tower several stories high. The principal streets lead from the 4 gates to the centre of the town, and are broad and well paved; and the houses are built of unburned brick or mud and have a mean appearance, though some of them are commodious and well furnished. There are some temples and public offices. The river is crossed by a bridge of boats, and large suburbs extend for a considerable distance along both banks. Tien-tsin derives its importance from being the terminus of the grand canal and the port of Peking, and is said to have formerly been a place of great wealth and extensive trade; but since the banks of the canal were broken by the inundation of the Hoang-ho the trade has declined greatly, and the place has now the appearance of decay. Treaties were concluded here in 1858 between the Chinese government and the plenipotentiaries of England, France, Russia, and the United States, the chief provisions of which were the right of residence for a British minister at the court of Peking, permission for all to send special embassies to the capital and to travel and trade in all parts of the empire, the opening of several new ports, and the settlement of the question of transit dues.

TIERS ÉTAT (Fr., third estate), a name applied previous to the revolution of 1789 to that portion of the French people which was not included among the clergy or the nobility, and which comprised $\frac{19}{20}$ of the population. The *tiers état* appears as a third branch of the French states-general as early as the 13th century, and at all meetings was duly represented by its deputies, who however were so greatly outnumbered by those of the other two branches, that the measures voted upon in common were almost invariably decided in favor of the privileged classes. The refusal of the clergy and nobility to reform this abuse by giving the *tiers état* a representation proportioned to their actual numbers accelerated the crisis of the French revolution, to the consummation of which the pamphlet of Sieyès, *Qu'est ce que le tiers état?* greatly contributed. The term is now purely historical.

TIFFIN, a town and the capital of Seneca co., Ohio, situated on both sides of the Sandusky river and on the line of the Sandusky, Dayton, and Cincinnati railroad, 33 m. S. W. from Sandusky City, and 180 m. N. N. E. from Cincinnati; pop. in 1860, 4,500. It has several manufacturing establishments, 5 weekly newspapers and 2 monthly periodicals, 2 banks, a large union school building, the county buildings, and 12 churches. Heidelberg college and theological seminary, under the supervision of the German Reformed church, is at this place.

TIFLIS, or **Teflis**, a town of Asiatic Russia, in Georgia, capital of the government of the same name and of all the Transcaucasian provinces, situated on the river Koor, 1,100 feet above the level of the Black sea, in lat 41° 41′ N., long. 44° 50′ E.; pop. estimated at 50,000. It stands in a narrow valley midway between the Black and Caspian seas, at the foot of a line of barren hills, with ranges of lofty mountains on both sides. It is surrounded by a wall with 6 gates, has several forts, and is built upon both sides of the river, which is crossed by a wooden bridge. To the southward of the town there are extensive ruins of an old fortress, on a hill nearly 400 feet above the level of the bridge across the Koor. Tiflis has many Greek and Armenian and 2 Roman Catholic churches, some of which are very handsome buildings. There are numerous schools, and several good shops and hotels, in the new town or part chiefly occupied by the Russians. The population is extremely varied, being made up of Tartars, Persians, Lesghians, Circassians, and Russians. Tiflis is celebrated for its warm baths. The mineral springs are chiefly situated at the S. end of the city, and the temperature of the hottest is 115° and that of the coldest 75°. These waters are said to be very beneficial in cutaneous disorders and rheumatic complaints. The climate is exceedingly hot, and bilious diseases prevail. The manufactures consist of carpets, shawls, &c.; and a considerable trade is carried on with Persia. Wine is produced in the neighborhood, but the flavor is not relished by strangers.—Tiflis was founded about A. D. 469 by a monarch named Vakhtang, who conquered the territory lying between the lack and Caspian seas, and was the capital of the nominally independent kingdom of Georgia, though devastated by Genghis Khan, and frequently in the possession of the Turks or Persians. Aga Mohammed Khan, shah of Persia, destroyed it in 1795, and reduced a large portion of the inhabitants to slavery. The last king of Georgia ceded it to Russia in 1801, since which its population has more than doubled.

TIGER (*felis tigris*, Linn.), one of the largest, strongest, and most active of the cat family, peculiar to Asia. It is usually about 8 feet long and between 3 and 4 feet high, but is occasionally seen considerably larger than this; the ground color is bright orange yellow, the face, throat, and under parts nearly white, and all elegantly striped with transverse black bands and bars, rendering it one of the most beautiful of quadrupeds; it is less high but longer and more slender than the lion, with rounder head and more cat-like form; the colors are brightest in the adult male, the young being grayish with obscure dusky bands. Having no mane, its appearance is less majestic than that of the lion, and its countenance conveys an impression of treachery and wanton cruelty. Bloodthirsty and ferocious when hungry, it lies in ambush at early dawn by the sides of springs and rivers for animals as they come to drink; it is able to leap a great distance upon its prey, carrying off a buffalo with apparent ease, a powerful man being as nothing in its jaws; its motions are exceedingly supple and graceful; it passes the day for the most part in a shady covert, gorged and sleepy from the morning meal. Its north and south geographical range is extensive, from northern China to the Malay peninsula, but it is most abundant in the vast jungles lining the banks of the great rivers of Hindostan. In many parts of Bengal it is the terror and scourge of villages, prowling around the outskirts, and attacking cattle in the fold and on the road, though the natives protect them in part by noisy drums by day and torches by night; men and women not unfrequently fall victims when they incautiously venture into the jungle. The English rifle has nearly cleared the thickly settled districts from these animals, against which the native traps and weapons (spears and poisoned arrows) are comparatively powerless. Tiger hunting is a favorite sport in India, especially with English officers; the native princes go in great state, mounted on elephants, with a large train of men on foot and on horseback, attended also with dogs; it is an exciting and dangerous pastime, often resulting fatally to men, horses, and elephants. In the East the tiger is considered the emblem of power, and in China the justice seats of the mandarins are covered with tiger skins; the tiger hunters of the native armies are the bravest and best of their soldiers, and a tiger's head, profusely decorated with jewels, is one of the chief ornaments of royal state. The tiger makes no noise comparable to the roar of the lion, but rather a loud grunting sound. It may be tamed when taken young, though its temper cannot always be depended on; it was formerly sometimes seen as the apparently gentle and subdued attendant of the Indian fakir; it breeds in captivity, though less frequently than the lion; hybrids between the Asiatic lion and tigress have been born in menageries, but have not reached maturity; their color is brighter and the bands better marked than in young lions or tigers of unmixed race. The tiger was less known to the ancients than the lion and African spotted cats; Aristotle never saw one, and Pliny says that the first one known in Rome was a tame one belonging to the emperor Augustus. For recent and interesting accounts of tiger shooting, the reader is referred to Capt. Shakespear's "Wild Sports of India" (London and Boston, 1860).—The so called American tiger is the jaguar (*F. onca*, Linn.).

TIGER CAT, a name commonly applied to several small species of *felinæ*, in America, Asia, and Africa, especially to those ornamented by bands and bars. Among the American species, the ocelot has been described under that title, and under the same the margay (*felis tigrina*, Linn.). The *F. eyra* (Desm.) is called tiger cat; it is about the size of the house cat, but with longer neck, body, and tail; it is uniform brownish red, with under jaw and nose spot white, paler below; like the ocelot, it comes from Guiana as far north as Mexico and Texas. The *F. yaguarundi* (Desm.) is larger, with a much longer body; it is grizzled brownish gray without spots; hairs ringed and tipped with black; the young more rufous; it extends from Paraguay to Texas. Both of these cats frequent woods and thickets, feeding on small mammals and birds, and are excellent climbers. Another South American tiger cat is the chati or chibeguazu (*F. mitis*, F. Cuv.), about 21 inches long with a tail of 11; it is pale tawny yellow, white below, with lines of black spots on neck and back and circles of the same on the body and limbs, and tail ringed above with black; it is a beautiful and graceful animal, about 14 inches high, diurnal in habit, of a gentle disposition (whence its specific name), and with a cry somewhat harsher and more prolonged than that of the common cat.—There are several tiger cats in Asia, of which the largest and handsomest is the rimau-daban (*F. macrocelis*, Temm.); it is about 3 feet long, with a tail of 2½ feet more, and 16 inches high at the shoulders; the head comparatively small, ears short and rounded, body cylindrical, limbs very robust, tail very full and long, and fur thick and soft; it is ashy or brownish gray, with irregular spots and bands of velvety blackness arranged longitudinally and unbroken along the back; border of mouth black, and feet gray. It is a native of Sumatra, and lives much on trees, hence called tree tiger; the food consists of birds and the smaller deer; it is not very common, and not dreaded by the natives except for its visits to their poultry yards; it has none of the fierce expression of the tiger and leopard, and is playful and gentle in captivity. The Javanese or Sumatran tiger cat (*F. minuta*, Temm.) is 2 feet long, of which the tail is 9 inches, and 10 inches high; the color is grayish brown in the adult, the lower parts and inside of limbs white; back marked with lines, sides with irregular blotches, and limbs with small spots of dark brown; tail imperfectly ringed, black at tip; the young are reddish brown, paler below, with rows of lengthened spots on back and sides, smaller and more numerous on limbs, and no black at tip of tail. It inhabits the extensive forests of Sumatra and Java, remaining concealed in hollow trees during the day, prowling at night in search of food, and often committing depredations on hen roosts; it feeds principally on small mammals, but if hard pressed will eat carrion; it is fierce, untamable by confinement, and very shy and cunning. Diard's tiger cat (*F. Diardi*, Desm.), also from Java, is 3 feet long, of which the tail is 16 inches; it is yellowish gray, with spots and rings of black, resembling the ocelot in the enclosed spots on the sides, and the rimau-daban in the ample fur of the tail and the distribution of the markings. The Nepaul tiger cat (*F. Nepalensis*, Vig. and Horsf.) is 23 inches long, with a tail of 11; the color is tawny gray, nearly white below, the markings of back in irregular lines, of body in angular blotches, and of legs in blackish spots; the form is long and civet-like, head small, and neck and tail comparatively slender and lengthened; it has been placed by some in the genus *prionodon* (Horsf.), one of the connecting links between the civet and the cat families.—The animal commonly called tiger cat by the furriers has been described under SERVAL, an African species.

TIGER MOTH. See MOTH.

TIGHE, MARY (BLACKFORD), a British authoress, born in Dublin in 1774, died in Woodstock, Kilkenny co., March 24, 1810. She was married in 1793 to her cousin, Henry Tighe of Wicklow co., a member of the Irish parliament, and in 1805 printed for private circulation her "Psyche," a poem in the Spenserian stanza, founded on the story of Cupid and Psyche as related in the "Golden Ass" of Apuleius. It passed through several editions in her lifetime. She died of consumption after several years of uninterrupted suffering, and is commemorated by Moore in the well known lyric commencing, "I saw thy form in youthful prime." In 1811 appeared a complete edition of her poetical works, containing many pieces of a devotional character written during her last illness.

TIGRANES I., a king of Armenia, who ascended the throne about 96 B. C., and died about 55. He was a descendant of Artaxias, the founder of the Armenian monarchy, and by wars during the early part of his reign united all Armenia under his rule, and conquered in addition several provinces. He enlarged his dominions still more by conquest from the Parthians, and assumed the title of king of kings, and in public always appeared attended by tributary princes. Early in his reign he married Cleopatra, daughter of Mithridates, king of Pontus, with whom he formed an alliance. The dissensions which distracted Syria opened a fair field for his ambition, and enabled him by 83 B. C. to gain possession of that country from the Euphrates to the sea, of which he held undisputed control until 74, when his alliance with his father-in-law brought him into conflict with the Roman power. At the instigation of Mithridates, he marched into Cappadocia at the head of a vast army, reduced that country, and carried off 300,000 of the inhabitants, many of whom he settled in his new capital, Tigranocerta. Mithridates, who had derived little support from his son-in-law, was at length obliged to flee to him for refuge; and to the haughty demand of Appius Clodius, the ambassador of the Roman general Lucullus, that the fugitive king should be given up, Tigranes replied with a declaration of war. Lucullus crossed the Euphrates and Tigris, marching into the interior of Armenia, utterly defeated an army of 150,000 foot and 55,000 horse, and took possession of Tigranocerta. Tigranes prepared to collect a new army, and both he and Mithridates labored, though without success, to bring Phraates, king of Parthia, into an alliance; on the other hand, many princes of the neighboring countries submitted themselves to the Romans, and Antiochus Asiaticus was placed upon the throne of Syria. In the summer of 68 Lucullus again totally routed the Armenian forces on the river Arsanias, and was only prevented by the disaffection existing among his troops from making himself master of Artaxata, the ancient capital of the country. All the advantages which might have been derived from this victory were destroyed by the conduct of the Roman troops, whose mutinous spirit was said to have been secretly fomented by Pompey. Lucullus was compelled to retreat, his lieutenant L. Fannius was defeated, and a great part of the former possessions of Tigranes came again into his power. In 66 Pompey arrived to take the supreme command, and in a great battle on the Euphrates defeated Mithridates, who had been seeking to recover his lost dominions. At the same time a son of Tigranes of the same name had engaged in a conspiracy against the life of his father, and being discovered had fled to Phraates, who readily embraced his cause and marched an army into Armenia, which advanced near Artaxata and then retired without taking that city. Tigranes was easily able to drive out his rebel son, unsupported by a foreign force; but suspecting his father-in-law to have been engaged in the conspiracy against his throne, he refused to receive him after his defeat and flight, and even set a price of 100 talents on his head. As the Roman army under the guidance of his son was rapidly approaching Artaxata, he repaired in person to the camp of Pompey, and placed himself as a suppliant at the feet of that general. Pompey would not accept the diadem which he offered him, and treated him in a friendly manner, placing him on the throne of Armenia proper with the exception of Gordyene and Sophene, which were made a separate kingdom to be governed by the young Tigranes. The old king gave the Roman general 6,000 talents, and also subsidized the Roman troops; and remaining faithful to the Roman cause, he received in 65 the province of Gordyene, which had been seized by Phraates. In 64 he was again at war with the king of Parthia, but the differences between them were composed by the intervention of Pompey. After this he disappears almost entirely from history. He was succeeded by his son Artavasdes.

TIGRÉ, a district of Abyssinia, lying between lat. 12° and 15° 30′ N., and long. 37° 25′ and 40° 15′ E. It is an elevated plain which forms the basis of several mountain chains, the principal of which are the Samen and the Taranta ranges, the latter being also called the Haramat. The Samen runs from N. E. to S. W., separating the Atbara and Bahr-el-Azrek, and has several summits from 12,000 to 16,000 feet high. The Taranta range follows the line of the N. E. coast, separating the basin of the Tacazze from the Red sea; its highest summits do not much exceed 7,000 feet. The plateau itself is from 3,500 to 7,000 feet in elevation. The deep ravines which separate these mountain chains are the beds of rivers of considerable size. The Tacazze is second only to the Bahr-el-Azrek in size among the rivers of Abyssinia. The Mareb and the Guenqua are the other principal rivers. Tigré is divided into 13 petty chieftaincies or districts; the principal towns are Antalo, the capital, Tackeraggiro, Sokota, Axoom, Adowa, and Dixaur. Adowa is the largest town of the country, is the entrepot of trade on the great caravan route between Massowah and Gondar, and has considerable manufactures.—The district was for many years an independent kingdom, and was governed by a king named Ubye; but in 1854 Theodorus, king of Abyssinia, conquered it, taking Ubye prisoner, and still holds it as a province of his empire.

TIGRIS, the second river of western Asia, rising in the southern slope of the Armenian chain of the Taurus, E. of Malatiyah on the Euphrates, and taking a S. course to Diarbekir, whence its direction is S. E. to Mosul, and thence S. by E. to its junction with the Euphrates at Korna, where the two form the Shat-el-Arab. At its source it is not more than 10 m. distant from the Murad or E. branch of the Euphrates, and for 80 m. below Bagdad it is parallel with the Euphrates itself, being not more than 30 m. distant, and separated by a range of hills. It then diverges to the east, and for the rest of its course till near its junction is from 80 to 100 m. distant from that river, to which however it is united by several canals. Its total course is estimated at 1,150 m., and its width from Mosul to Bagdad, a distance of about 220 m., averages 200 yards; its current in March flows 4½ m. an hour. It is subject to annual floods, when it overflows its banks, especially in the lower part of its course. The greatest height is attained in the latter part of May, and it resumes its usual level by the middle of June. It is navigable between Diarbekir and Mosul for rafts at certain seasons of the year; below Mosul it is navigable for steamers at all seasons. Between the Euphrates and Tigris lies the once fertile and populous region formerly known as Mesopotamia, and near its source was, according to some, the lost Eden. Wars and bad government, the neglect of irrigation, and some changes in the course of the river, have reduced this region, once the garden of western Asia, to a desert. The banks of the Tigris are deserted, and except in the vicinity of Diarbekir, Mosul, and Bagdad, the only inhabitants are members of nomadic Arab tribes. The ruins of Nineveh, Seleucia, Ctesiphon, Opis, &c., are on its banks; and the discoveries of Rich, Botta, Layard, Rawlinson, and Lobdell were made in the mounds of ruins which line its shores. (See EUPHRATES.)

TILE, a thin sheet of baked clay, flat or curved, used for covering floors, roofs, or the walls of buildings, and also by the ancients for the flues of baths and for drains. In ancient times tiles were used by the eastern nations of a great variety of sizes and for numerous purposes, the Assyrians even employing them as tablets for writing. Upon flat slabs of fine terra cotta and upon cylinders and prisms of the same material, or sometimes of glazed ware, they impressed with extreme neatness characters which remain to this day among the most imperishable monuments of antiquity. The Egyptians employed tiles for the same purpose, but wrote upon them with black ink with a reed, while the Assyrians indented the characters with a sharp instrument in the soft clay before it was baked. The roofing tiles were sometimes flat and laid overlapping each other like slates; but they were more generally of the semi-cylindrical form, laid in rows up and down the roof, the rows having the concave side upward holding the alternating rows laid with the convex side upward. The Greeks used large flat roofing tiles, sometimes having flanges, with semi-cylindrical ones laid over their lines of junction. The flat tiles were often stamped with brief inscriptions, and the others were ornamented with painted devices. The Greeks employed tiles for flues of baths, in the construction of tombs, and for drains. The Romans used them still more generally, and their name, *tegulæ* (from *tegere*, to cover), came to be applied even to bricks, which were much more used than tiles; the real distinction between them is in the greater fineness of the tile. The roofing tiles were, like some of those of the Greeks, large and flat, furnished with flanges rising about 2½ inches above their surface, which when two adjacent tiles were set together were overlapped by the arched tile or *imbrex* set over them. Flat tiles alone were also used for covering roofs. It was customary to stamp the tiles with inscriptions designating the pottery, the manufacturer, the name of the estate which supplied the clay, the name of the emperor or of the consulship, and various other matters. They thus have often served as records of important historical events. As a covering of interior walls, the tiles used by the Romans were large thin squares of terra cotta, generally ornamented on one side with incised devices. The tessellated pavements were formed of small cubical tiles known as *tessellæ* (the diminutive of *tesseræ*, from the Gr. *τεσσαρες*, four, having reference to their shape). Some of these were not more than ½ of an inch square, and they were laid to form mosaics after various designs. The Romans, like the more ancient nations, made use of large flat tiles in the construction of their graves, and also as we use gravestones for receiving monumental inscriptions. In modern times tiles are used for coverings of roofs, chiefly in warm countries, their weight rendering them objectionable where much snow falls. Snow moreover is apt to be driven up under them, even though they exclude rain perfectly well. Glazed tiles several inches square, variously colored and ornamented, arranged in patterns, are much used for the floors of public buildings and in the better class of private houses. (See Encaustic Tiles.) In the last century it was very much the fashion to adorn fireplaces with a row of porcelain pictured tiles on each side and over the top. Among the devices were often seen series of quaint illustrations of Scripture events, of Æsop's fables, &c.

TILGHMAN, William, an American jurist, born in Talbot co., Md., Aug. 12, 1756, died in Philadelphia, April 30, 1827. He studied law in Philadelphia, and was admitted to the Maryland bar in 1783. In 1793 he returned to Philadelphia, and practised his profession in that city till 1801, when he was appointed chief judge of the circuit court of the United States. In 1802 the law establishing this court was repealed, and Mr. Tilghman returned to the practice of the law till 1805, when he was appointed president of the courts of common pleas in the first district; and in 1806 he was elected chief justice of the supreme court of Pennsylvania. In 1809 he made an elaborate report on the English statutes in force in Pennsylvania; and his only other published work is a "Eulogy on Dr. Caspar Wistar."

TILLANDSIA, a genus of singular plants of the natural order *bromeliaceæ* or pineapple family. The name was given to them by Linnæus in memory of Dr. Elias Tillands, a professor at Abo in Sweden, and was intended to be suggestive of his aversion to travelling by water from their thriving best in arid situations. There are numerous species, and most of them belong to South America. According to Dr. Chapman, in his "Flora of the Southern United States," there are at least 8 species at the South. The long moss (*T. usneoides*, Linn.) is found hanging from the live oak and other trees in humid districts from North Carolina to Florida. It is a perennial, its small fine roots penetrating the fissures of the bark; its stem thread-like, long, covered as well as the leaves with membranaceous scales dotted in the centre; the centre of the stem and leaves composed of a filiform, black, horny thread; the flowers solitary, axillary, sessile, with 3 or 4 bracts at base; calyx and corolla divided nearly to the base, segments lanceolate, corolla 3-cleft, campanulate. In winter the plant affords a scanty fare for cattle; and the stems, beaten until the bark peels off, are used for stuffing mattresses, &c., instead of horse hair, which they much resemble.—The tillandsias are all parasitical; some are remarkable for their showy flowers, others for their long, serrated, and stiff leaves, hollow at the base. Under cultivation in the greenhouse or parlor window, they only require a piece of wood or a basket of rotten chips, in which they will thrive.

TILLEMONT, Louis Sébastien le Nain de, a French historian, born in Paris, Nov. 30, 1637, died Jan. 10, 1698. He was educated at Port Royal, studied logic, theology, and ecclesiastical history, and at the age of 23 entered the episcopal seminary of Beauvais, where he remained 4 years. He became a subdeacon in 1672 and a priest in 1676, when he went to reside with the recluses at Port Royal; and after that establishment was broken up in 1679, he retired to his estate of Tillemont, between Vincennes and Montreuil, which he never again left except for a visit in 1681 to his friend Arnauld and the other refugees in the Netherlands. His principal works are: *Mémoires pour servir à l'histoire ecclésiastique des six premiers siècles* (16 vols. 4to., 1693–1717), and *Histoire des empereurs et des autres princes qui ont régné durant les six premiers siècles de l'église* (6 vols. 4to., 1698–1738). His *Vie de St. Louis* was first published in 1847.

TILLER. See Steering Apparatus.

TILLOCH, Alexander, LL.D., a Scottish inventor and philosopher, born in Glasgow, Feb. 28, 1759, died in Islington, London, Jan. 26, 1825. He was brought up to the business of his father, a tobacconist, but paid most attention to mechanical and scientific pursuits. In connection with Foulis, a celebrated Glasgow printer, he improved Ged's method of printing from casts of whole pages of type, but failed to render stereotype printing practicable at that time, though his suggestions to Earl Stanhope, 30 years later, may have led to its success. After carrying on the printing business for some years in Glasgow, he removed to London in 1787, and in 1789 purchased the principal part of the "Star" newspaper, which he edited till 1821. He devised a plan of printing bank notes by which their forgery could be prevented, but could not induce the government to adopt it, and was not allowed to accede to proposals from the French republic for its employment in the printing of assignats. In 1797 he commenced the "Philosophical Magazine," which he published and edited alone till a few years before his death. In 1824 he started a third periodical, the "Mechanics' Oracle," which did not long survive his death. Among his other pursuits was the investigation of the prophecies and the Apocalypse, on which he published several dissertations, one of which bears the title of "Dissertations introductory to the Study and Right Understanding of the Language, Structure, and Contents of the Apocalypse" (8vo., 1823). Dr. Tilloch was a dissenter, and for many years preached to a small body called Christian Dissenters, in Goswell street road. He was a member of many scientific societies in Great Britain and on the continent.

TILLOTSON, John, an English pulpit orator and prelate, born at Sowerby, near Halifax, in 1630, died in London, Nov. 22, 1694. His father, a clothier, was a strict Calvinist. At an early age Tillotson became a student in Clare hall, Cambridge, where he was made a fellow in 1651, and remained till 1657, when he became tutor in the family of Prideaux, Cromwell's attorney-general. While a student, the reading of Chillingworth's writings had converted him from Puritanism, and at 30 years of age he took orders in the English church. His success was speedy, and his fame as a preacher soon gave him a choice among preferments. He was successively curate of Cheshunt, rector of Keddington, and preacher at Lincoln's Inn in London, and finally drew crowds to his lectures in St. Lawrence's church, Jewry, in that city. As a champion of the Protestant party, Tillotson was led to oppose the proclamation of Charles II. for liberty of conscience, which made him unpopular at court; and the offices of dean of Canterbury and prebendary of St. Paul's, which Tillotson obtained, were reluctant concessions to his popularity rather than hearty gifts. Tillotson preached earnestly against popery, advocated the exclusion of the duke of York, and prepared the way by his personal influence for the change of rulers. He was the leading member of the commission of 20 divines appointed in 1689 to examine and revise the liturgy. On the accession of William III. he received the office of dean of St. Paul's, and in 1691 was made archbishop of Canterbury. His only legacy to his widow was his collection of manuscript sermons, for the copyright of which she received 2,500 guineas. They are rather moral essays than doctrinal sermons, and deal with ordinary duties and interests more than with the high themes of religious discourse. Their peculiar merits are clearness and moderation, both in statement and argument, and liberality of tone. Indeed, the tone of Tillotson's sermons goes far to justify the charges brought against him of lax orthodoxy. Few prelates had warmer friends or more bitter enemies. His marriage with a niece of Cromwell brought him into intimate connection with Wilkins, bishop of Chester, whose posthumous works he edited. His funeral sermon was preached by Bishop Burnet, his special friend. His life was written by Dr. Thomas Birch (8vo., London, 1752). His sermons were published in 1704 in 14 vols., and in 1757 in 13 vols., and were translated into German by Mosheim. His complete works were published 1718 in 9 vols. During his life he published in folio 54 sermons, and the "Rule of Faith," in 4 parts (2d ed., 1699).

TILLY, John Tzerklas, count of, a German soldier, born in the castle of Tilly, Brabant, in 1559, died at Ingolstadt, April 30, 1632. He was educated at a college of Jesuits and imbibed their religious principles, but left their order to enter military service. He fought in the Netherlands under the duke of Alva, Don Juan of Austria, and Alexander Farnese; then went to Hungary, where, under the duke of Mercœur, he distinguished himself against the Turks. In this war he reached the rank of general of artillery. In 1609 he entered the service of Duke Maximilian of Bavaria, who appointed him field marshal, and intrusted him with the reorganization of his army. On the opening of the 30 years' war he was placed at the head of the Catholic army, and contributed to the victory of Weissenberg, near Prague, Nov. 8, 1620; in 1621 took the strongholds of Pilsen and Tabor, which belonged to Count Ernest of Mansfeld, the stanchest supporter of the Protestant cause, and defeated the margrave of Baden on the banks of the Neckar; and in 1622 expelled Prince Christian of Brunswick from the Palatinate, worsting him at Höchst, June 8, and routed his army once more at Stadtloo in Aug. 1623. When Christian IV. of Denmark joined the German Protestants, he gained a great victory over that prince at Lutter, in Aug. 1626, and forced him back to his kingdom. A little later, notwithstanding the reënforcements the Danish king had received from England and France, Tilly besieged Nordheim, which he took after a hard struggle, crossed the Elbe, subdued the continental part of Denmark, and concluded with him the peace of Lübeck, May 12, 1629. In the following year, Wallenstein being deprived of his power, Tilly, who was already the general of the Catholic league, received the chief command of the imperial troops, and had now to oppose King Gustavus Adolphus of Sweden. He marched against the city of Magdeburg, which had entered into an alliance with that prince, carried it by storm, May 10, 1631, and allowed his infuriated soldiers to sack it in the most dreadful manner; it was reduced to ashes, and 30,000 persons were slaughtered. This act of vandalism excited universal indignation and horror. He met Gustavus at Breitenfeld, near Leipsic, Sept. 7, 1631, was terribly defeated, losing 7,000 killed and 5,000 prisoners, and fled with the miserable remains of his army. "The old corporal," as the king of Sweden called him on account of his being a strict disciplinarian, the man who had never before been conquered, lost his *prestige*, and soon after his life, dying of a wound received while attempting to oppose the passage of Gustavus across the Lech, April 10, 1632.

TILSIT, a town of Prussia, in the province of East Prussia and government of Gumbinnen, situated on the left bank of the lower Niemen or Memel at its junction with the Tilse, 60 m. N. E. from Königsberg; pop. in 1858, 13,748. The Memel is crossed by a bridge of boats 1,150 feet long; and the town consists of one principal long wide street lined with good houses. It has a castle erected in 1537, several churches, a gymnasium, infirmary, workhouse, hospital, schools, and numerous charitable institutions. The manufactures include woollen goods, leather, hardware, and arms. The river is navigable up to the town. Napoleon met the emperor of Russia and the king of Prussia upon a raft moored in the centre of the river, a little below the town, June 25, 1807, and the three there signed the treaty of Tilsit.

TIMANTHES, a Greek painter, born probably in Cynthus, flourished about 400 B. C. He was a contemporary of Zeuxis and Parrhasius, and one of the most celebrated artists of antiquity. Only 5 pictures by him are mentioned by ancient authors. Of these, 2 gained prizes in competition with Parrhasius and Colotes; and one of them, representing the sacrifice of Iphigenia, has been perhaps the subject of more criticism than any other ancient work of art. The representation of Agamemnon concealing his face in his mantle, though highly lauded by the ancients as a method of expressing grief, has been objected to by several modern writers, including Sir Joshua Reynolds, as a "trick" of the painter. Fuseli, however, ably vindicates Timanthes in hiding the face of Agamemnon, "not because it was beyond the possibility, but because it was beyond the dignity of expression."

TIMBER. See Wood.

TIMBS, John, an English author, born in London, Aug. 17, 1801. In 1827 he became the editor of the "Mirror," a low-priced weekly journal, which was remarkable as one of the first attempts to found the now popular cheap press; but he is chiefly known by his historic compilations. He published in 1855 a volume entitled "Curiosities of London," a compendium of antiquarian and local information respecting the English capital. This was followed by "Things Not Generally Known," a series in 5 volumes; "School Days of Eminent Men;" "Stories of Inventors and Discoverers, and Anecdote Biography" (4 vols.). He has edited the "Arcana of Science" and the "Year Book of Facts in Science and Art" (1839 *et seq.*), and was also for many years sub-editor of the "Illustrated London News," but withdrew from that journal in the beginning of 1858.

TIMBUCTOO, or Tombuctoo, a town of central Africa, on the borders of the Sahara, about 9 m. from the river Niger or Quorra, in lat. 18° 4′ N., long. 1° 45′ W.; pop. about 13,000, greatly increased during the season of trade, from November to January. It is surrounded by a clay wall, about 3 m. in extent, built in the shape of a triangle. The houses are closely packed together, and mostly built of clay and stone; some of them are two stories high, and show considerable taste in their decoration. The port of Timbuctoo is at Kabra on the Niger, which has a vast artificial basin, and is accessible for only 4 or 5 months in the year; but the most valuable traffic is by caravans, for which Timbuctoo is the central station of N. Africa. Gold dust is the great article of trade, but many native products and foreign manufactures are also found here. The merchants of Timbuctoo are generally only agents of those at Mogadore, Morocco, Fez, &c.; and this, with the incessant conflicts of race and religion, prevents the accumulation of wealth here. It has a mixed population of indigenous negroes, Tuariks, Bambaras, Mandingos, Arabs, and Foolahs, the governing race. Its origin dates from the 12th century, but it was long known in Europe only by reports of native travellers, until it was first reached by Major Laing in 1826, and furtively visited by Caillié in 1828. In 1853 Dr. Barth resided there nearly a year, and has given full details upon it.

TIMOLEON, a Corinthian general, liberator of Syracuse, born about 394 B. C., died in 337. He belonged to one of the noblest families of Corinth, and from early youth was distinguished for his hatred of tyranny and his courage. His elder brother, Timophanes, was an energetic and ambitious man, and occupied a high station in the military service of the Corinthians; and in a battle against the Argives and Cleonæans, while holding the command of the cavalry, he was thrown from his horse, and would have been killed but for the devotion of Timoleon. The Corinthians afterward equipped a standing force of 400 mercenaries, placed them in the citadel as a garrison, and gave the command to Timophanes, who immediately took the supreme power into his own hands, and perpetrated various acts of cruelty. Timoleon remonstrated with his brother to no purpose. A second time he went to the acropolis attended by some friends, and when he found his pleading of no effect, his companions with his concurrence slew Timophanes. The people of Corinth, thus unexpectedly freed from an odious tyranny, were divided between admiration for the patriotism and horror at the fratricide; but the former feeling was largely preponderant. His mother, however, cursed her son, and in spite of his earnest entreaties refused to see him again. The life of Timoleon was now embittered by the imprecations of his mother and the reproaches of the minority, and it was only through the appeals of his friends that he was prevented from executing his design of starving himself to death. Twenty years passed by, according to Plutarch, and he refused to bear any important office in the Corinthian service. In 344 Syracusan envoys reached Corinth asking for aid for Sicily, which since the death of Dion had been rent by internal dissensions, and was now in addition threatened with subjection to Carthaginian rule. The assistance solicited was granted, but no leader could be found to undertake the apparently hopeless task; and while the archons doubted whom to choose, an unknown voice in the crowd called out the name of Timoleon. He accepted the command, and immediately set about preparing for the expedition; but his means were limited, and at last he set sail with only 10 triremes, having on board 1,000 men, chiefly mercenaries. In the mean time Hicetas, tyrant of Leontini, one of those who had sent to Corinth for aid, had formed an alliance with the Carthaginians against Dionysius the Younger, and endeavored to prevent Timoleon's entry into Sicily. But the latter eluded him and the Carthaginian ships by a stratagem, landed at Tauromenium, and was hospitably received by Andromachus. The first opportunity for active operations came from the town of Adranum, 40 miles distant, which was divided into two parties, one of which sent for aid to himself and the other to Hicetas. The latter was nearer, and reached the city with 5,000 men; but his force was suddenly attacked and put to flight by the troops of Timoleon, who had made a rapid march by the shortest but most rugged route. The victory enabled him to form an alliance with several of the cities of Sicily, and with reënforcements to march his army under the very walls of Syracuse, of all which Hicetas had control except the island of Ortygia, in which Dionysius lay encamped, and blockaded by the Carthaginian fleet. Dionysius at once gave up to Timoleon the island, with its garrison, arms, and magazines, and sailed for Corinth. There the news of the great success of Timoleon excited the highest enthusiasm; 2,000 hoplites and 200 horsemen were instantly voted and equipped, but were for some time prevented from reaching Sicily by a Carthaginian squadron. In the mean while the Corinthian leader retired to Adranum, while Hicetas, with a fleet of 150 Carthaginian triremes and a land force of 60,000 men, prosecuted the attack on Ortygia. But as supplies stole in from Catana to the relief of the garrison, it was determined to employ a part of the besieging force in the reduction of that place. While they were gone, Neon, the commander of Ortygia, attacked the blockading force, and gained possession of the section of the city called Achradina, which he joined to Ortygia and fortified. The force that had gone forth to attack Catana returned immediately, while Timoleon at the head of 4,000 men marched from Adranum. Mago, the Carthaginian commander, now began to distrust Hicetas, and soon sailed away with his whole fleet and all his troops; and the portion of the city held by Hicetas was taken without the loss of a single man. Timoleon was now complete master of Syracuse, and could easily have made himself tyrant; but he at once called together the inhabitants for the purpose of demolishing the strongholds and fortifications erected by former rulers, and upon their site built courts of judicature. The city had been so deserted and impoverished by civil and foreign wars, that, according to the statement of Plutarch, the market place served as a pasture for horses. A democratic constitution, based upon that of Diocles, subverted 70 years previously by Dionysius the Elder, was established, and 60,000 immigrants and restored exiles came to repeople the deserted town. But the Carthaginians, indignant at the return of Mago, prepared for another invasion; and an army of 70,000 men, led by Hasdrubal and Hamilcar, landed in 339 at Lilybæum. Among them was a body of 10,000 native infantry, one fourth of which constituted the sacred band. The inhabitants were panic-struck, and it was with difficulty that Timoleon could assemble 12,000 men for resistance. Even with this small force he determined to attack the enemy on their own ground, and accordingly set out for the western portion of the island. He reached an eminence overlooking the Crimissus just as the Carthaginians were crossing that stream, and, befriended by a violent storm which pelted the enemy directly in the face, completely routed them. The slaughter of the Carthaginians was terrible, their camp, their baggage, and immense plunder falling into the hands of the conquerors. After this victory he returned to Syracuse with a portion of his troops, and prepared to overthrow Hicetas and Mamercus, tyrants of Leontini and Catana, the latter of whom was also allied with the invaders. Carthage despatched to their assistance a body of Greek mercenaries under Gisco, and the troops of Timoleon suffered several partial defeats, though not while under his personal command. Hicetas invaded the territory of Syracuse; but on his return he was attacked and utterly defeated, Leontini was captured, and the tyrant with his son and the leader of his forces were taken and put to death. His wife and daughters were carried to Syracuse, and were there sacrificed by the inhabitants for the previous crime of Hicetas in putting to death the female relatives of Dion. Although Timoleon was not directly responsible for this judicial murder, his sanction of it is the greatest stain upon his conduct. He now turned his arms against Mamercus, whom he defeated near the river Abolus; and the loss of the Carthaginian auxiliaries was so serious that Carthage concluded a separate peace, and Mamercus fled to Messana, which was besieged and taken. Mamercus gave himself up, and was tried by the

Syracusan people, and executed. In this work of dethroning tyrants Timoleon proceeded until there were none left in the Grecian portion of Sicily. He now laid down his command both civil and military, and became a private citizen of Syracuse, the inhabitants of that city voting him a house and a landed property, where he resided, bringing his wife and family from Corinth. Yet, though he had given up his power, his character and moral ascendency were so great that he exercised all the functions of a real ruler throughout Grecian Sicily. Cities were repeopled, constitutions were modified, and public decisions were made in accordance with his advice. This was more especially the case in Syracuse, where he never interfered in political matters except in times of serious difficulty, and where his counsel was usually followed without discussion. Toward the close of his life he became totally blind. His funeral ceremonies were celebrated with great magnificence, and as his body was about to be burned the herald Demetrius made the following announcement: "The Syracusan people solemnize, at the cost of 200 minæ, the funeral of this man, the Corinthian Timoleon, son of Timodemus. They have passed a vote to honor him for all future time with festival matches in music, horse and chariot races, and gymnastics, because, after having put down the despots, subdued the foreign enemy, and recolonized the greatest among the ruined cities, he restored to the Sicilian Greeks their constitution and laws." Timoleon is one of the noblest characters in ancient history, and the interval of freedom which Sicily enjoyed from his arrival to the usurpation of Agathocles was due solely to his efforts. His life was written by Nepos and Plutarch.

TIMON, called THE MISANTHROPE, an Athenian who lived in the latter part of the 5th century B. C. In consequence of ingratitude experienced from those he had benefited, and of disappointments in friendship, he secluded himself from the world, and, except Alcibiades, admitted no one to his society. He is said to have died from a broken limb which he refused to suffer a surgeon to set. He is the subject of Shakespeare's "Timon of Athens."

TIMOR, or TIMUR, an island situated near the S. E. part of the Indian archipelago, extending in a N. E. and S. W. direction about 300 m., with a breadth varying from 40 to 60 m.; lat. of S. end, 10° 24′ S., long. 123° 32′ E.; area estimated at 12,200 sq. m.; pop. about 200,000. The native chiefs on the W. and S. coasts acknowledge the supremacy of the Dutch, who have their chief settlement at Coepang; while those on the E. and N. pay tribute to the Portuguese, who have established themselves at Delli. The coasts are not much indented by bays, but the harbors of Coepang and Delli are safe and commodious. The shores are lined in many places by rocks and sand banks; and several islets intervene between Timor and the island of Flores to the W. and New Guinea to the E., which are respectively distant 100 and 440 m. The island is traversed throughout its length by a mountain chain, which attains a height in the north of about 6,000 feet. Numerous offsets extend to the coasts on both sides, so that the surface is almost entirely occupied by mountains separated from each other by narrow valleys; but there are considerable tracts of level ground near the head of Coepang bay, one of which is about 10 m. square. The rivers are all short mountain torrents; many of them become dry in summer, and the water of all is unwholesome. Traces of volcanic origin are apparent in several places, and the island is subject to frequent earthquakes, the most destructive of which on record took place in 1794, when the church and other buildings at Coepang were thrown down. The mountains are generally bare and rocky, but in places there are forests of considerable extent. Gold, copper, and iron have been found in small quantities. In many places the land is barren, and the vegetation differs considerably from that of the western islands of the archipelago, but partakes very much of the character of that of N. Australia. The palms are few in number, and many of the rich fruits of the western islands are not found here. The animals found on the N. W. side of the central range of mountains resemble those on the western islands of the archipelago, but those on the opposite side are strongly allied to the fauna of Australia. The domestic animals have all been introduced, but with the exception of the horse and buffalo none of them are very numerous. Fish are plentiful on the coasts; pearl oysters are found in some places, and a kind of coral much prized by the Japanese is procured on the reefs. The people live chiefly by hunting. The women weave cloth, and the only manufactures which the men engage in are the construction of canoes and ornaments for their horses. The inhabitants are of low stature, with very dark complexions and bushy hair. A considerable trade is carried on, principally from Coepang, and is chiefly in the hands of the Chinese. Timor appears to have been well known to the Malays and Javanese, who traded to it, long before the arrival of the Portuguese in the eastern seas.

TIMOTHEUS, an Athenian general, died in Chalcis 354 B. C. He was the son of the general Conon, and first comes into public notice in 378 B. C., when, along with Iphicrates and Callistratus, he was made general of the fleet which was engaged in bringing over the islands and maritime cities to the Athenian confederacy, in which undertaking he was especially successful. In 375 he was sent with a fleet of 60 triremes to move about the Peloponnesus and alarm the coasts of Laconia, and by the justness of his dealings and the fairness of his professions gained over numerous allies to the Athenian cause. Near Alyzia he was attacked by a Spartan fleet, which he defeated. The next year, peace being made between Athens and Sparta, he was recalled; but in consequence of his stopping on his way home at Zacynthus and forcibly restoring some democratic exiles, war was again declared. In 373 he was appointed commander of a fleet to be sent to the relief of Corcyra, but in order to obtain seamen and funds was obliged to make a preliminary cruise among the insular allies, remaining absent so long as to endanger the loss of Corcyra. His appointment was consequently cancelled, and an accusation was entered against him, which was tried in November at Athens, Alcetas, tyrant of the Molossians, and Jason, king of Pheræ, appearing as witnesses in his favor. He was acquitted, and in the spring of 372 accepted the command of the Greek mercenaries serving under Artaxerxes II. of Persia against Nectanebus I. in Egypt. Soon after returning from this war, he was sent by the Athenians with an armament to the coast of Asia Minor to assist Ariobarzanes, satrap of Phrygia; but finding that the latter was in revolt against Artaxerxes, he refused him direct aid in accordance with his instructions, but turned his force against the island of Samos, of which he became master after a siege of 10 or 11 months. In return for this conquest, which really shook the authority of Artaxerxes and aided the revolt of Ariobarzanes, the latter made over to him Sestus and Crithote, which secured to the Athenians a partial control of the Hellespont and the occupation of a large surrounding territory. Timotheus was then appointed in place of Iphicrates to an extensive command, including Macedonia, Thrace, and the Chersonese. With the aid of Macedonia he reduced Torone, Potidæa, Pydna, Methone, and various other cities belonging to the Olynthian confederacy, but was unsuccessful in the attack upon Amphipolis. In 363–362 he proceeded against Cotys, king of Thrace, and to the defence of the Athenian possessions in the Chersonese, in which he is said to have been successful, notwithstanding the appearance of a Theban fleet under Epaminondas; but for some reason not now known he retired from his command. In 358 the cities of Eubœa sent messages to Athens entreating aid against the Thebans, who had despatched a large force into the island. Through the energy of Timotheus, within 5 days an Athenian fleet and army under his command was in Eubœa, and in the course of 30 days the Thebans were forced to evacuate the island under capitulation. In 356, the second year of the social war, Chares, Iphicrates and his son Menestheus, and Timotheus were appointed to the joint command of an Athenian fleet, which first directed its attention to the reduction of Byzantium, whereupon the fleet of the Chians and their allies raised the siege of Samos and sailed to the Hellespont. The Athenian commanders agreed upon a common plan of action, when a sudden storm arose, which in the judgment of Iphicrates and Timotheus rendered it unadvisable to begin a battle. Chares thought differently, and calling upon the men to follow him rushed into the fight without his colleagues and was driven back. Hereupon he wrote to Athens accusing his colleagues of corruption and backwardness in not supporting him. A trial of accountability was afterward held at Athens, in which Iphicrates and Timotheus were charged with having received bribes from the Chians and Rhodians, and with betraying their trust by deserting Chares at a moment when success might have been gained. The former was acquitted, but the latter was found guilty and condemned to pay a fine of 100 talents, although it is not known what caused the difference in the sentences. The fine was the largest ever imposed at Athens, and Timotheus after the trial retired to Chalcis in Eubœa. After his death his son Conon was permitted to compromise the fine by paying 10 talents for repairing the walls of the city. Isocrates, the friend of Timotheus, says that the result of this trial was due to the great unpopularity of the latter in Athens. In the foreign service he had been scrupulously just in his dealings, but his haughtiness had made him extremely unpopular among the political leaders at home. His life was written by Cornelius Nepos.

TIMOTHY (Gr. Τιμόθεος, "honored of God"), a disciple of Paul, and his companion in travel and in preaching. He was a native of Derbe or Lystra, and the son of a Greek and a Jewess. To prevent the cavils of the Jews, Paul circumcised him. He was regularly set apart to the office of the ministry by the laying on of the hands of Paul and the presbytery. He journeyed, partly in company with Paul and partly commissioned by him, through Macedonia and Achaia; later he was sent by Paul to Ephesus, whence he accompanied the apostle to Jerusalem, and probably to Rome. In the epistles of Paul written during his captivity at Rome, Timothy is mentioned as being with the apostle. According to ecclesiastical tradition, Timothy was the first bishop of Ephesus, and suffered martyrdom under Domitian.

TIMOTHY, Epistles to, two canonical books of the New Testament, addressed by the apostle Paul to his disciple Timothy. They are mentioned by Tertullian, Clement of Alexandria, and Origen, but are not contained in the collection of Marcion. In modern times, Schleiermacher attacked the authenticity of the first epistle, and after him the authenticity of either the first or both epistles has been doubted by Baur, Reuterdahl (now archbishop of Lund), Meyer, De Wette, Ewald, Credner, and others; against whom it has been defended by Hug, Guericke, Thiersch, Wieseler, Reuss, and others. The first epistle is supposed to have been written about the year 65, and contains instructions respecting the qualifications of various officers in the church, and strong exhortations to fidelity. Purity of conduct and improvement of his spiritual gifts are urged upon

Timothy, and particular directions are given him with regard to various classes of persons. The second epistle was written during the captivity of Paul at Rome, and while he was in expectation of martyrdom. It gives instructions on Christian steadfastness and fidelity (ch. i.); exhorts Timothy to constancy (ch. ii.); warns him against false teachers, invites him to come to Rome, and gives information of many of the companions of Paul (ch. iii. and iv.). The two epistles to Timothy, together with the one to Titus, are comprised under the name pastoral epistles. Recent commentaries on them have been written by Heydenreich (Hadamar, 1826), Hatt (Tübingen, 1831), Mack (Tübingen, 1836), Mathies (Greifswalde, 1840), and Ellicott (London, 1861).

TIMOTHY GRASS (*phleum pratense*, Linn.), a gramineous hay plant, much cultivated in New England and New York, where it is also called Herd's grass, from a Mr. Herd, who, according to Jared Eliot (1750), found it in a swamp near Piscataqua, and in Pennsylvania, where it is known by the first name, derived, it is said, from Mr. Timothy Hanson, who first introduced it either from Europe or from New England, and extensively cultivated it. Loudon says that Mr. Hanson introduced it from America into England, but other authorities call it a native of Europe. In England it is called the meadow cat's tail. Its stem or culm rises to the height of 2 to 4 feet, and is smooth and round; its leaves are flat, rough on their upper surfaces; the sheaths long and striate, smooth; the stipules blunt; the flower spikes long, cylindrical, upright; the flowers consisting of 2 truncated and awned glumes fringed upon their backs, and of 2 membranaceous paleæ, distinct styles with white stigmas, and the stamens with purple anthers. Although coarse and hard if allowed to ripen its seed, timothy grass, cut when in blossom or soon after, is greatly relished by stock, and is found to possess a large percentage of nutritive matter. It is well adapted to laying down reclaimed bogs, such as abound in peat, and in instances where 4 tons have been produced per acre the timothy has constituted the bulk of the hay. In drier lands, though its yield is fair, yet it is at a disadvantage because it is tardy in aftergrowth, and needs shading at the roots with clover. Another European species (*P. alpinum*, Linn.) occurs among the White mountains of New Hampshire, and to the northward.

TIMOUR, or Tamerlane (a corruption of Timour Lenk, *i. e.*, Timour the Lame), an oriental conqueror, born in the village of Sebz, in the district of Kesh, about 40 m. S. E. from Samarcand, in 1335, died in Otrar on the Jaxartes, Feb. 19, 1405. He was the son of the chief of the Turkish tribe of Berlas, which inhabited Kesh, and on his mother's side was a direct descendant of Genghis Khan. His birth happened in a period of general anarchy, and of constant and petty wars between the powers which had come into possession of the empire of Genghis. At 12 years of age he entered military life, and in 1361 became chief of the tribe of Berlas, and succeeded in expelling from the kingdom of Transoxiana the khan of Kashgar, who had invaded it with an army of Getes or Calmucks. In this war he was once plunged into a dungeon, from which he escaped, swimming in his flight the broad stream of the Jihoon; and he also received a wound in the thigh at the siege of the capital of Sistan, which left him permanently lame. He had during these scenes of tumult supported the cause of Hussein, khan of northern Khorassan, and after having driven out the Calmucks he married the sister of that powerful chief. With him he had frequent contentions, being unwilling to endure either an equal or superior, and on one occasion sent him the message that "he who wishes to embrace the bride of royalty must kiss her across the edge of a sharp sword." At last the difference between them broke out into an open war. With a body of horsemen numbering only 250, he surprised and took the city of Nakhshab, defended by a garrison of 12,000, and in 1366 totally defeated his rival near his capital Balkh. Hussein was put to death, and Balkh taken in 1369, after a siege of 3 years. In the same year a general diet was held, and Timour proclaimed khan of Jagatai, Samarcand being chosen as his residence. He now aspired to the dominion of all the countries once under the power of Genghis Khan, and attacked the neighboring princes in detail. The khan of the Getes, ruling the country between the Jaxartes and the Irtish, was forced to render homage, and in 1379 the khan of Khiva was conquered. He then undertook the reduction of Khorassan, and received the submission of a part of it, but was met with a fierce resistance by Gaiyath-ed-Deen-Pir-Ali, whose capital was Herat. His efforts were all in vain, and the taking of his capital by storm paved the way for the easy conquest of the remainder of the country. All Khorassan was now in his power; but the town of Sebsewar revolted, was stormed, and 2,000 of the inhabitants while still living were placed upon one another, until the whole pile assumed the shape of a tower, and the layers of human beings were then fastened together by mortar. Aspiring now to the conquest of the world, Timour fixed his eyes on Persia, ruled by petty tyrants, who were successively beaten. All Persia was soon in his power, and the country between the Tigris and the Euphrates, from the sources to the mouths of those rivers, submitted to his authority, and the Christian princes of Georgia also became his tributaries. An invasion of Timour's territory by Toctamish, whom he himself had established in the Mongol empire of the north, led to the conquest of western Tartary. The pursuit of his enemy having led the conqueror of the East into the provinces of Russia, he threatened Moscow, marched to the south, and sacked and burned Azof at the mouth of the Don. He now turned his attention to the conquest of India, at the idea of which his emirs at first revolted. "The rivers!" said they, "and the mountains and deserts! and the soldiers clad in armor! and the elephants, destroyers of men!" But the conqueror was neither to be terrified nor turned aside. The vast army crossed the Indus in 1398 at the passage of Attok, and, after a long march, in which he massacred 100,000 captives, stood before Delhi. A battle was fought in the plain near the city, and the stately capital of Hindostan became the prize of the victors. He penetrated still further into the country, when he was recalled by the news of insurrections in Georgia and Anatolia, and of the designs of Bajazet, sultan of Turkey. His first care was to crush the rebellion in Georgia, and as the Mongol and Ottoman conquests now bordered upon one another, a collision was soon rendered certain. Timour overran Syria, then a dependency of Egypt, and having stormed the revolted city of Bagdad, July 9, 1401, left in the public places of the town a pile of 90,000 slaughtered human beings. At last the two great armies of the sultan and the Mongol conqueror met on July 20, 1402, on the plains of Angora, and the former was totally defeated, and captured in attempting to save himself by flight. The story that Timour placed his royal prisoner in an iron cage is now deemed doubtful, but in spite of the authority of the Persian historians of the times, it is almost certain that Bajazet was treated harshly, and not long afterward he died. Timour's dominions now covered all Asia from the Irtish and Volga to the Persian gulf, and from the Ganges to Damascus and the archipelago. He might have added Europe to his conquests, but he had not a single galley to transport his army over the narrow sea which divides the two continents, nor could he prevail upon either the Turks or the Greeks to furnish him with any means of transportation. Both submitted to pay tribute to the oriental conqueror, however, and he was also gratified with the nominal allegiance of the sultan of Egypt. He now retired to Samarcand, and spent two months in festivities, but did not long remain idle. He had planned an invasion of China, from which the house of Genghis had recently been expelled, and previous to his return from his Ottoman conquests had sent an army beyond the Jaxartes to prepare the way for his own advance. At the head of 200,000 veteran troops he began his march, crossed the Jaxartes on the ice, and had already gone a distance of 300 miles from his capital when he was overtaken by death. His army was disbanded and the invasion of China was given up. He died after a reign of 36 years, all of which was spent in military operations, and left 36 sons and grandsons and 17 granddaughters. A large proportion of his conquests, especially in the northern and western parts of Asia, were lost immediately by his successors, among whom constant dissensions prevailed. Even his race would have become extinct, had not one of his descendants fled before the Usbeks of the north to accomplish the conquest of Hindostan.—The great authority for the life of Tamerlane is the Persian history of Sheref-ed-Deen-Ali, to whom the journals of his secretaries were intrusted, and whose work has been translated into French by Pétis de la Croix under the title of *Histoire de Timur-Bec, connu sous le nom du grand Tamerlan* (4 vols. 12mo., Paris, 1722). The writings attributed to Timour are only known to exist in Persian, and are of questionable authenticity. The "Institutions," with an English translation and a valuable index, was published at Oxford in 1783 (4to.) by Major Davy and White, the professor of Arabic, and has also been translated into French by Langlès. The "Commentaries" of Timour have been translated from a manuscript of Major Davy by Major Stewart, late professor of oriental languages in the East India company's college, and published by the oriental translation committee of London. These only contain his life from his birth to his 41st year, no version having as yet appeared of that portion containing his last 30 years of war and western conquests. The latest work is a translation of the narrative of Clavijo, envoy of Henry III. of Castile to Timour, by C. R. Markham (Hakluyt society, 1860).

TIN (Lat. *stannum*), a metal resembling silver in color and lustre, though presenting a yellowish tint when the white light reflected from its surface is excluded; symbol, Sn; chemical equivalent, 59; specific gravity, 7.29. It is harder than lead and softer than gold, melts at 442° F., and is not sensibly volatilized at high temperatures, though at a strong red heat it emits white fumes. When very slowly cooled from a melted condition, it becomes crystalline, presenting either rhombic plates or octagonal needles, which are distinctly brought to view by treating the external surface with dilute aqua regia. The surface thus prepared is ornamental, and the French make use of this material (*moire métallique*) for the covers of snuff boxes, &c. The crystalline structure of the metal is the cause of the peculiar crackling sound emitted when a bar of tin is bent backward and forward; this sound is designated by the French *le cri d'étain*, or tin cry. Considerable heat is developed by the friction of the particles of metal upon each other. Tin is very malleable, especially when its temperature is raised to 212°. It is readily rolled or beaten into sheets not more than $\frac{1}{1600}$ of an inch thick, and is drawn into fine wire. The metal, however, is deficient in tenacity, a wire of $\frac{7}{16}$ inch diameter sustaining only 34½ lbs. weight. At ordinary temperatures tin is slowly tarnished by exposure to air and moisture, but when melted its surface is soon covered with a film of oxide, and at high temperatures its oxidation takes place so rapidly as to cause ignition, and the metal burns with a brilliant white light. A current of steam passed over the melted metal produces the same oxidizing effect. The product of combustion is first a pulverulent gray oxide, and then a yellow white powder called putty of tin, which is the binoxide, consisting of oxygen 27.2 and tin 100. Tin is violently attacked by nitric acid, and slowly by strong hydrochloric acid heated, while it is not affected by dilute sulphuric acid. It combines with several other metals, and forms with them a variety of useful alloys, as also the amalgam employed for silvering mirrors. (See Amalgam, Britannia Metal, Bronze, Mirror, Pewter, and Speculum.)—Tin was used by the ancient Hebrews, Egyptians, and Greeks, and was an especial object of the Phœnicians in their voyages to the southern coasts of Britain. Although it is questioned whether the *bedil* of Ezek. xxvii. 12, Numb. xxxi. 22, Isaiah i. 25, &c., is correctly rendered by the Greek *κασσιτερος*, and this by the English tin, there is no question but that the bronze vessels and implements of very remote periods, found at Thebes and other parts of Egypt, are in part composed of tin, which metal Wilkinson suggests the Egyptians may have obtained from Spain or India long before the voyages of the Phœnicians into the Atlantic. Tin is frequently named in the Iliad, and appears to have been a metal with which the Greeks were familiar. Homer speaks of it as being employed for the raised work on the exterior of shields, for making greaves, and binding together parts of armor, as also for household and ornamental purposes; and, as remarked by Wilkinson, the Greek word named above, translated tin, "is the same as the Arabic name *kasdeer*, by which the metal is still known in the East. It is also called *kastira* in Sanscrit." Strabo, Diodorus Siculus, Pliny, and other ancient writers describe the commerce carried on by the Phœnicians with certain islands off the coast of Britain, named, on account of the quantity of tin there obtained, the Cassiterides. These islands were doubtless the Scilly islands, S. W. of Cornwall, and may have been visited to receive tin brought to them from the tin region of Cornwall; or the Phœnicians, who carefully concealed the real source of their profitable commerce, may have given them this name to mislead the Romans, who long sought to discover the secret. Interesting papers upon this subject may be found in vols. iii. and iv. of the "Transactions of the Geological Society of Cornwall;" see also "Report on the Geology of Cornwall, Devon, and West Somerset," by Sir Henry de la Beche, p. 522. Spain as well as Cornwall furnished this metal to the Phœnicians; and both countries were to this enterprising race what America at a later period was to the Spaniards. In exchange for valuable metals, the early navigators gave earthenware vessels, oil, salt, various implements of bronze, and other objects easily manufactured by a skilful people, and possessing much value among the rude natives of the mining regions. It is supposed that the beautiful bronze swords, daggers, and spear heads occasionally found in England in the graves of the ancient Britons, were brought into the country for this purpose by the Phœnicians. In the middle ages Cornish tin was largely used for the bells of churches, and at a later period it was in still greater demand for bronze cannon. The Cornish mines in the reign of King John appear to have been managed principally by Jews. Discoveries are still occasionally made of the ruins of furnaces, which are called Jews' houses; and small blocks of tin of an ancient date are also met with, called Jews' tin. The history of these mines is recorded in the "Survey of Cornwall," by Richard Carew (1602, reprinted 1769); in the "Natural History of Cornwall," by the Rev. Richard Borlase (1758); and in various other English publications. Tin mines were discovered in the district of Meissen and in Bohemia in the 12th or 13th centuries; and in 1250 the low price at which the Germans sold their tin seriously affected the English trade. Spain still yields some tin. Other important European localities of tin at the present time are Altenberg in Saxony; Zinnwald and Schlackenwalde in Bohemia; near Limoges in the department of Haute-Vienne, at Pyriac near Nantes, in Loire-Inférieure, and at Villedieu in Morbihan, France; and in Dalecarlia, Sweden. The ore is abundant in the Siberian mining district of Nertchinsk; and in southern Asia, it has been very extensively worked in the island of Banca since the discovery of the mines in 1710. In 1751 there were produced here 370 tons; in 1852, 5,235 tons; and in 1853, 3,745 tons. More ancient mines have also been worked to a considerable extent in the Malay peninsula in the province of Tenasserim; in 1858 they yielded 900 to 1,000 tons. There are others in the N. portion of Burmah, and also in Madagascar. Tin ore is imported into England from Victoria in Australia, where it occurs in broken transparent crystals in the deposit gold mines. As early as 1850, 9 tons 9 cwt. of tin were imported from Australia; in 1854, 8⅓ tons tin and 52 tons ore; in 1855, 49 tons ore; in 1856, 350 tons ore; and in 1857, 816 tons ore. On the American continent, the ore is found in Brazil, Peru, Chili, and Mexico. Peru supplied very variable quantities, amounting in 1856 to 289 tons tin and 371 tons tin ore and regulus. The tin product of Bolivia has been stated to attain 3,000 tons annually, which is enormous, but the produce is certainly very large. The Mexicans obtained tin from the mines of Tasco, of which they made bronze for cutting instruments of great hardness, and small pieces of tin in shape of a T were used for money. Cortes had bronze cannon made with the tin of Tasco. Tin in Greenland is associated with cryolite. In the United States, a few small crystals of the oxide of tin have been found at Chesterfield and Goshen, Mass., and also at Lyme, N. H. At Jackson, N. H., is a vein which has furnished small specimens of the ore, and the metal has been detected in the magnetic iron ores of the highlands of New York and New Jersey, and in some of the auriferous ores of Virginia. In California it is found in such quantity as to encourage the hope of its becoming an important product. Native tin is reported to have been met with in small grayish white grains in the gold washings of Siberia.—The only ore that is worked is the binoxide, SnO_2, also termed cassiterite, tin stone, &c. It occurs in a variety of forms, as crystallized in right prisms with a square base, also in rolled pieces, called stream tin, among the sand and gravel of superficial deposits, and in concretionary forms, resembling wood in their fibrous structure and concentric layers. The last variety is often known as wood tin. It is in mammillary and kidney-shaped masses, sometimes of a clear brown, and sometimes of a blackish brown color. The concretions are occasionally met with enveloping crystals of quartz in layers, at first parallel to the faces of these crystals, and gradually becoming bent and circular in the external layers. The crystallized oxide of tin has more resemblance to several earthy minerals, as brown idocrase, zircon, &c., than to metallic ores. It is distinguished however by its great weight, its specific gravity being 6.8 to 7.2. Its hardness is 6 to 7. The crystals are usually of brilliant lustre, brown or black, sometimes red, gray, white, or yellow. Tantalum, iron, manganese, and columbic acid have been found in small quantity in specimens of tin ore. Mixed with borax and carbonate of soda, the ore is easily reduced by the blowpipe on charcoal, but alone it is infusible, and in acids it is insoluble.—Several artificial compounds of tin and oxygen are obtained possessing acid properties. Metastannic acid (Sn_5O_{10}) is a white, crystalline, insoluble mass, obtained by treating metallic tin with nitric acid. After being treated with cold water and then rendered anhydrous by ignition, it constitutes the polishing material known as putty powder, used for giving whiteness and opacity to enamels and for polishing plate. Another oxygen compound is stannic acid (SnO_2, HO), which combined with soda forms a compound largely prepared as a mordant for the use of the dyer and calico printer. It is the basis of what is technically known as tin-prepare liquor. The salt is also used for tinning copper. Three compounds of tin and sulphur are known, of which the bisulphuret is used in the arts as an imitation of bronze under the name of mosaic gold. The protochloride and bichloride of tin are used in dyeing and calico printing. The former has a strong affinity both for chlorine and oxygen, and acts as a powerful reducing agent. When added to a solution of chloride of gold, a purple powder is precipitated, which is an obscure compound of sesquioxide of tin and oxide of gold. It is known as purple of Cassius, and is used for coloring porcelain and glass, with which it is incorporated by fusion.—The geology of the tin veins of Cornwall has been noticed in the account of the mines of that region in the article COPPER MINES, vol. v. p. 684. Until the last century it was the tin alone that gave value to these mines; and when in working them yellow copper ores took the place of tin in depth, as was generally the case, the mines were abandoned. When the mines have afterward been worked for the sake of the copper, they have again in many instances been found productive of tin at still greater depths. The modes of occurrence of tin ores are various. Their original source is in veins, in many of the larger of which the ore is obtained in crystalline masses associated with pyritous iron and copper and with ores of antimony and arsenic. The gangue of the veins consists of quartz, fluor spar, heavy spar, and apatite, with which are found tourmaline, mica, topaz, wolfram, and other minerals. It is also found diffused through small veins and threads clustered together and penetrating the rock in certain lines, or disseminated through the mass in proportion sufficient to render it profitable to work, though the particles of ore may be imperceptible to any but an experienced eye. A fourth mode of occurrence is in alluvial deposits, in which lumps are found that have been washed from the larger veins, and present a rolled appearance like nuggets of gold found under the same conditions. These deposits have been worked from the earliest periods of tin mining, and for centuries all the tin of Cornwall was obtained from them exclusively. The ore they produce is known as stream tin, from the application of currents of water employed to separate it from its earthy and stony accompaniments. Some of these alluvial deposits have attained a great depth, even within the historic period. Thus at the Carnon tin stream works, N. of Falmouth, the excavations have been carried to the depth of 50 feet, where the tin pebbles are found overlaid with vegetable accumulations containing human skulls, remains of deer, and trees in the place of their growth. The small flat veins are sometimes very numerous, running between the layers of killas from one large vein to another, and are known as tin floors. When the ore is disseminated in small veins and particles through masses of rock, which is usually the variety of porphyry called in Cornwall elvan, the repository is sometimes worked open to the day like a quarry. The veins with which the rock is charged are often mere threads, and seldom exceed 8 or 9 inches in thickness; and even these are so irregular and interrupted, that their direction or inclination cannot always be determined. This mode of occurrence of ores is called by the Germans a *Stockwerk*. The principal veins of tin are found in three districts, the first and most productive in the S. W. of Cornwall beyond Truro, the second around St. Austell, and the third near Tavistock, in Devonshire.—Stream tin, being a pure ore, requires no preparation for the reduction process; but that obtained from the veins, being much mixed with other ores and stony matters, requires to be carefully sorted and dressed. When obtained from lodes which yield copper ore also, the two kinds are separated as well as may be by hand, and the best and purest fragments of tin ore are kept by themselves, and those less rich form another division. The latter are reduced to powder under heavy stamps, large batteries of which are worked in connection with the mines. The pulverized ore is washed away from the stamps by a strong current of water, and in the first vats through which it passes the richer and coarser particles are deposited. The remainder passes on through the dressing apparatus, consisting of buddles, tossing tubs, shaking tables, &c., by which it is separated as completely as possible from its accompanying impurities. The concentrated ores are next roasted in reverberatory furnaces in order to decompose the sulphurets and arseniurets, the fumes from which pass off into a chimney through condensing chambers, in which the arsenious acid is collected. When purified by another sublimation, this is converted into the white arsenic of commerce. The roasting of a charge of 6 to 10 cwt. of ore requires from 12 to 18 hours. The heat is very gradually raised till it reaches a dull redness, and occasionally during the process the door is opened and the charge is raked over the hearth. On its ceasing to exhale white fumes it is withdrawn from the furnace and falls into an arched chamber beneath, where it is allowed to cool. It is then again washed, by which it is easily freed from the chief portion of its impurities. But if much copper is present, the roasted tin ores are commonly placed in a vessel containing dilute sulphuric acid, which dissolves the copper without affecting the oxide of tin, which after washing in pure water is ready for the smelter. The mineral wolfram (a double tungstate of iron and manganese), which accompanies some tin ores, is so nearly of the same specific gravity with the oxide of tin, that they cannot be separated by mechanical means; and it is then necessary to decompose the wolfram by mixing a little carbonate or sulphate of soda with the ore and heating this to redness in a reverberatory furnace. The tungstic acid unites with the soda, forming a soluble compound, which may be removed by water, and after crystallization be employed by the calico printers as a mordant. The smelting of tin ores was conducted by very rude methods even into the 17th century. Remains of old furnaces are occasionally met with in Cornwall and Devon, with remnants of the scoria produced in the operations and of the peat that was used for fuel. As an evidence of the imperfection of the process, samples of the scoria have been found to contain 22.85 per cent. of oxide of tin. Some of the furnaces or hearths were cavities excavated in the ground, in which the fires were no doubt kept up by a blast. Pit coal was first successfully used in the reign of Queen Anne, and soon after reverberatory furnaces were invented and found to be better adapted than the blast furnaces hitherto in use for reducing the ores. At the present time this kind of furnace is used in Cornwall exclusively for the common class of ores, which are mixed with anthracite dust or other pulverized carbonaceous matter and heated by fires of bituminous coal. Blast furnaces are used only for the best ore or stream tin, and for this only when it is desired to obtain very pure metal. Tin ores are smelted near the mines with fuel brought from Wales, as return freight for vessels which carry copper ores to be reduced in the great smelting establishments at Swansea. Tin smelting in reverberatory furnaces is conducted in establishments termed smelting houses, and the blast furnace operation in what are known as blowing houses. In the former process the charge consists of 20 to 25 cwt. of ore containing from 60 to 65 per cent. of tin, mixed with pulverized anthracite and a small quantity of slaked lime or fluor spar as a flux for combining with the silicious portions of the ore. After the charge has remained in the furnace 6 or 8 hours with the doors closely shut, and subjected to a high heat which has been gradually increased in intensity, a door is opened at the further extremity of the furnace under the escape flue, and the melted matter is worked up with a long paddle in order to determine its condition and separate the metal from the slags. When the reduction appears to be complete, the latter are raked out upon the floor and sorted. About ⅔ of the whole should be free from metal and requires no further treatment. Another portion may contain 4 or 5 per cent. of tin in small shot, which may be separated by stamping and washing. A third portion, consisting of the scoriæ last raked out, is so rich in tin as to be saved for the next melting process. The melted metal is then drawn off through an opening in the side furnace into a cast iron pot, and a new charge is introduced into the furnace. The scoria adhering to the tin soon rises upon its surface and is skimmed off, and the metal is then ladled into rectangular moulds. It still contains so many impurities, as iron, arsenic, copper, and tungsten, together with some oxide of tin, that it is necessary to subject it to further processes of refining. The blocks are laid up together near the fire bridge of the furnace, and gradually brought to the point of fusion. As they melt the tin flows down the hearth and into the outer basin, and an infusible dross of ferruginous matter remains behind. More blocks of tin are charged; and this liquation or sweating operation is continued till about 5 tons of melted metal are collected. The dross is then removed, to be afterward returned to the furnace with the stamped and washed scoriæ of former processes. The metal in the pot is refined by sinking into it green wood held by an iron frame, which causes a violent ebullition with the evolution of gases and aqueous vapor. A scum formed of oxide of tin and other oxides collects upon the surface, and is skimmed off to be returned to the smelting furnace. The boiling with green wood is continued for about 3 hours, and another hour is allowed for the subsidence of the fluid metal. This diminishes in purity from the top down; the upper portion, which is pure metal, is carefully ladled into cast iron moulds and set aside as refined tin; the middle portion produces tin of second quality; while the lowest is so impure, that it is necessary to subject it again to the reduction process. A method called tossing is sometimes employed instead of refining by the introduction of green wood; this consists in keeping the fluid metal in agitation by lifting up portions in a ladle, and letting them fall from a considerable height into the pot, whereby oxidation of the foreign metals is effected, and their collection upon the surface in a scum. The purest variety has been found to contain 99.76 per cent. of tin and 0.24 per cent. of copper; common tin, 98.64 per cent. of tin, 1.16 of copper, and 0.20 of lead; and the poorest, which is only fit to be returned to the furnace, 95 per cent. of tin. About 30 cwt. of coal is consumed for every ton of metallic tin obtained, and the loss of the metal in the process is about 5 per cent. Smelting in a blast furnace, formerly practised to some extent in Cornwall, and generally at the present time in the Erzgebirge in Saxony, involves the consumption of a larger proportion of fuel, and an average loss of 15 per cent. of metal, owing to the oxidizing effects of the blast; but the tin obtained by it, on account of the better quality of both ore and fuel, is much superior to that made by the other method. The old English blast furnaces were only about 6 feet high, and those of the Germans are about 10 feet high. The bottom stone is made much thicker in the back than in the front, so as to present a considerable slope toward the breast of the furnace. Diffused matters continually flow down this surface and under the front wall into a receptacle hollowed out of a mass of granite and lined with a mixture of clay and powdered charcoal. In this the separation of the slags from the metal takes place, and as they float upon the surface they are removed, while the metal itself is occasionally drawn off through a tapping hole in the front of the basin, into a smaller receptacle in which it is refined by thrusting into it a pole of green wood. The slags and different varieties of metal are treated like those obtained by the other smelting process. The tin is cast in moulds of white marble into blocks of different sizes, the largest of which weigh about 3 cwt.; it is from these that the commercial term block tin is derived. Another form in which the metal is sent to market is termed grain tin; this is produced by heating the blocks in a bath of melted tin, and when the metal has assumed a crystalline structure it is taken out and shattered by a blow into long crystalline fibrous columns.—Tin is used in a pure state for a few purposes only; sometimes for the bearings of wheels and also for dyers' kettles, but more particularly in the condition of foil for a variety of purposes. The metal is beaten into very large sheets, some of which measure 200 by 100 inches, which is as thick as a common card. These are cut up and reduced to small sheets not exceeding $\frac{1}{1,000}$ of an inch in thickness. The process is, to first reduce it between rolls, and then hammer it one sheet at a time upon a large iron surface or anvil. The hammers employed for this purpose are provided with very long handles, and are worked with great skill and caution to avoid making holes in the sheet. What is known as the white Dutch metal is much thinner than the common sheets, mentioned above. Tin foil is used for coating Leyden jars, and for making the amalgam used for electrical machines, and more largely for enclosing small packages of tobacco and spices, covering tops of champagne bottles, &c., to exclude the air. The only use of the large sheets is for silvering looking-glasses. (See MIRROR.) Tubes of pure tin are used for gas fittings, and have been recently applied to the construction of cheap vessels for containing the liquid colors used by artists, as also other solid and fluid substances required to be hermetically sealed and at the same time admitting the abstraction of small quantities. Tin wire is soft, moderately tenacious, completely inelastic, and admits of being bent and unbent many times without breaking.—The most important application of tin is for the coating of plates of sheet iron, producing what is known as tin plates or sheet tin, or, as called in Scotland, white iron. The Romans understood the art of coating copper with tin, and their *vasa stannea* are supposed to have been made of the former metal and overlaid with tin. The disagreeable and injurious qualities of the copper were thus obviated, while the advantages of its strength and facility of shaping were retained. The coating was easily effected by dipping the copper vessel, when thoroughly clean, into melted tin;* but iron did not so readily take this coating, nor was it produced in thin sheets, and the method of preparing these and cleaning them for this purpose appears not to have been discovered until the 17th century. It is supposed to have been first practised in Bohemia, and was introduced into Saxony in 1620, and into England in 1670. The first successful works in operation in England were established at Pontypool about the year 1720. The method of rolling iron invented by John Payne in 1728 at once furnished the means of producing plates adapted for this operation; and these are now carried to a high degree of perfection through successive improvements in the manufacture of iron, brought about in great measure in consequence of the need of a superior quality of sheet iron for this use. The best of pig iron, and that specially adapted for making the strongest and most ductile wrought iron, is selected, and is converted in a chafery or hollow fire and a finery in which charcoal is employed as fuel, and which causes the plates to be known as charcoal tin plates. A light spongy coke is also used, made from very pure bituminous coal, and purified while hot by the action of steam, which is found to answer an equally good purpose with charcoal. When converted into blooms, these are reheated and worked over several times, and drawn down into bars and plates; the latter are repeatedly doubled and passed through rolls, trimmed at the edges, reheated, and again rolled and doubled, till sometimes 16 distinct thicknesses are passed together between the rollers as one. Care is taken that they are not heated so high as to be welded together, and they are partially separated from time to time. When sufficiently rolled, the rough edges of the pile are cut off by a pair of shears, and the plates are divided across to reduce them to the required dimensions. They are then taken apart, the imperfect ones are rejected, and the good ones, called black plates, are immersed for 15 or 20 minutes in dilute sulphuric acid, which removes the scale of oxide, and leaves them with a clean dull gray surface. They are then rubbed with sand and water and washed, after which, being of a brittle texture, they require to be strengthened by annealing. Large numbers of them are placed in cast iron boxes, the covers of which are carefully luted down to prevent air entering, and the boxes are placed in a sort of reverberatory furnace, in which they are kept at a cherry red heat for 12 hours. They are then taken out, and the covers being removed the plates are examined, and those which are injured and adhere to one another through excessive heat are rejected; some may also be injured by partial oxidation, owing to penetration of air into the boxes. Those in good condition present a purplish surface derived from a thin external film of oxide. They are now in a cold state passed several times through very hard and smooth polishing rolls, thus acquiring a surface of extreme smoothness and lustre, but somewhat mottled from superficial oxidation. The rolling renders them brittle, so that they require annealing again, which is conducted at a milder temperature than before, and in about half the time. After this the plates are again sorted, and the good ones are again pickled for 10 minutes in sulphuric acid more diluted than before, and rubbed with sand and water. They are now perfectly clean, and ready to be tinned. Though by being exposed to the air a few moments they become rusty, they may be kept as long as desired immersed in pure water without risk of injury. With great care to keep them perfectly clean, they are removed to the tinning apparatus or "stow," which consists of a series of rectangular pots arranged in a long stack, each one over a separate fire to keep the materials it contains in a fluid state. The first of these, called the tinman's pot, about 2 feet long, 15 inches wide, and 20 inches deep, contains melted grease in which the plates are immersed and left till all the moisture upon them has evaporated. The second, called the tin pot, contains melted tin covered with a layer of grease; and into this the plates are next passed and left for about 20 minutes. The third, called the washing or dipping pot, consists of two compartments, each containing melted tin, the second of the purest quality, which as it becomes alloyed with iron is removed into the first compartment, and thence back to the second or tin pot. The plates are passed from the tin pot into the molten tin of the first compartment, and are left long enough to complete the alloy and to separate any superfluous tin adhering to the surface. They are then taken out one by one, laid upon a smooth portion of the stack, and after being wiped with a brush of hemp are dipped quickly into the pure tin of the second compartment, and immediately afterward into the fourth or grease pot, which is filled with melted grease carefully maintained at the proper temperature. The object of this is to allow any superfluous tin to run off, and more especially, by maintaining a uniform temperature, to prevent a more rapid cooling of the surface, which would cause the alloy to crack. After immersion for 10 minutes the plates are removed to the fifth pot, containing tallow heated to a lower temperature. The plates are thus annealed, and all that remains is to remove an edging of tin which usually forms around them. This is effected by dipping them into the last and smallest pot of the series, which contains melted cast iron over a bottom of tin ¼ of an inch deep. When immersed in this, the edging melts and is removed by a quick blow on the plate with a stick. To finish the plates for the market, they are cleaned of grease and dirt by rubbing them with bran and then with sheepskin. Defective plates are picked out and rejected, and the others are packed in boxes which are branded on the outside with the marks indicating the size and quality of the plates.—Iron is sometimes first coated with zinc, and when the surface has been cleaned by washing in acid or otherwise, it is tinned by dipping it into the fused metal, the surface of which is covered with fatty or oily matters. Rolled sheet or plate zinc when thoroughly cleaned is readily tinned by dipping it into the melted metal when heated to about its temperature. The zinc should not be left so long as to become alloyed with the tin beyond the mere surface.

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* The method of tinning copper now practised is to clean the heated surface of the metal by rubbing it with sal ammoniac, then sprinkling rosin over it to prevent oxidation, and pouring on melted tin, which is spread over the surface with tow, the workman keeping the metals at a high temperature. The addition to the tin of $^1/_4$ lead renders the operation easier by the greater fusibility of the alloy; but the introduction of lead may be objectionable from the danger of poisonous effects, similar to those it is desired to guard against by covering the copper with a harmless metal.

After being coated it may be rolled out, and if the tin is deficient more may be added by another dipping. Lead and its alloys may also be coated with tin by a similar process.—The production of the mines of Cornwall and Devonshire, from the year 1750 to 1800, varied from 1,400 to 2,000 tons per annum. It has since been as follows for the years named:

Years.	Tons.	Years.	Tons.	Years.	Tons.
1800......	2,522	1825......	4,358	1850......	6,729
1805......	2,785	1830......	4,444	1855......	6,000
1810......	2,036	1835......	4,228	1856......	6,177
1815......	2,941	1848......	6,618	1857......	6,582
1820......	2,990	1849......	6,952	1858......	6,920

The value of the tin per ton ranges in different years from £112 to £130, and the price has increased of late years.—The tin mines of Banca are next in importance to those of Cornwall. These are deposit mines, and are worked by excavations, carried down through beds of sand, clay, and gravel, sometimes to the depth of 20 or 25 feet. Soon after the discovery of the ore in the early part of the last century, the island was overrun by Chinese miners and adventurers, and the most favorable spots near streams of water were soon worked out. Between 1750 and 1775 it is supposed that they produced annually about 60,000 piculs or 120,000 ingots, and after 1780 not more than half this amount; and of late years the product has still further decreased. The smelting operation is conducted only once or twice a year, usually between February and April, in blast furnaces described as 10 feet long, 4 feet high, and 4 feet wide. The fireplace occupies a depression 3 feet deep in the middle, with a basin-shaped receptacle beneath it for the refined metal. The bellows is a wooden cylinder formed out of a single tree, and charcoal is employed as the fuel. On account of the heat of the weather the fires are run only at night, during which from 44 to 45 ingots are cast in sand moulds. The mines are in a granitic region, an account of which by Thomas Horsfield, M.D., is published in the "Journal of the Indian Archipelago and Eastern Asia," vol. iii., No. 7 (1848); see also "American Journal of Science," second series, vol. vii., p. 86. Tin is also found throughout the greater part of the Malay peninsula, and upon many of the islands between it and Java. The product of the mines is collected chiefly at Batavia, from which the exportation under the Dutch government amounts to about 2,000 tons annually. The quality of the tin of Malacca and of the islands differs very much according to the locality of its production, owing, as is supposed, to the difference of skill in the smelting process. The operations at Banca are said to be carried on upon a larger scale and more skilfully than at any other place in this region, and the metal from this island is consequently more highly valued. At Singapore, which is an important mart for this product, the price of tin has fluctuated of late years from $14 to $20 per picul, equal to about $11.75 to $16.75 per cwt. At the average of these prices the annual value of the whole Malay tin will be about $1,200,000. —The following table presents the value of tin and manufactures of tin imported into the United States for the years named:

Character.	1857.	1858.	1859.	1860.
Bars, blocks, and pigs....	$1,023,210	$1,292,707	$1,039,781	$1,130,599
Plates and sheets......	4,789,538	3,842,968	5,331,147	4,631,656
Foil..........	21,426	25,317	26,401	37,003
Manufactures not specified	31,922	27,675	28,638	26,939
Total.......	$5,866,096	$5,188,667	$6,425,967	$5,826,197

TINAMOU, a name applied to the *tinamidæ*, a family of rasorial or gallinaceous birds peculiar to South America. The bill is moderate, rather straight, flattened, the base covered by a membrane, and the tip suddenly hooked; wings short and concave; tail short or wanting; tarsi rather long, scaled in front, and without spurs; toes long, with stout blunt claws, the hind one sometimes wanting. They live in the fields on the borders of woods, are low and heavy fliers, but rapid runners, and feed on grains, fruits, and insects, often visiting newly sown spots to pick up the seeds; they lay about a dozen eggs, on the ground in tufts of grass, and the young when hatched soon disperse; such is their indisposition to fly, that when pursued they endeavor to hide in the bushes, and are often caught by a noose on the end of a stick; their flesh is exceedingly good; they vary from 18 to 6 inches in length, and are usually of a reddish or gray brown. In the genus *tinamus* (Lath.; *crypturus*, Illig.), the bill is shorter than the head, the upper mandible the longest, and the nostrils in the middle; first quill short, 4th and 5th longest; hind toe small and elevated. The great tinamou (*T. Brasiliensis*, Lath.) is about 15 inches long, of a deep olive color, slightly and narrowly banded with black, with crown red and secondaries red and black; pale reddish ash below; it is found in Guiana and Brazil, resembling in size, habits, colors, and quality of flesh, the partridges of the old world; though gentle and timid, it is said not to be capable of domestication. The males have a trembling plaintive whistle to warn of danger or attract the females; they live in couples during breeding time, at other seasons in small flocks; they seek their food in the morning and evening, scratching on the ground and covering themselves with dust like the common fowl. The nest is made on the ground in a slight hollow, covered with dry grasses; they lay twice a year; the young follow the parent as soon as hatched; they are said to roost on trees 2 or 3 feet from the ground. In the genus *rhynchotus* (Spix) the bill is longer than the head, slightly arched, the upper not overlapping the under mandible, and the tail is not visible on account of the numerous long soft coverts. The rufescent tinamou (*R. rufescens*, Wagl.) is 15½ inches long, ashy red above, banded with white and black; yellowish red below waved with brown; sides ashy. It inhabits the borders of the lakes and the swampy thickets of Paraguay in small troops; the eggs are 7, of a violet color; it is killed for its flesh, which is delicately white when cooked. In the genus *tinamotis* (Vigors) the bill is shorter than the head, the tail concealed by the pendulous coverts, the tarsi short and robust, and the toes short and thick, with claws broad and very convex above, and the hind toe wanting. There are only 3 or 4 species, inhabiting high, dry, and desert places, generally at some distance from fresh water, and feeding on seeds and small fruits; in some points these birds come near the bustards.

TINCTURE, in pharmacy, a solution, commonly colored (whence the name), of medicinal substances, usually in proof or diluted spirit, and with the same mixed with ammonia. This and ether are also used alone as the solvents, and preparations in which these are employed are known respectively as ammoniated and ethereal tinctures. Some highly colored acid solutions, as the preparations of chloride of iron, &c., are also called tinctures. This class of medicinal preparations are included under the more general name of extracts, and the methods of producing them have been described under that head. Compound tinctures are those containing two or more medicinal principles.

TINDAL, Matthew, an English theological and political writer, born at Beer-Ferris, Devonshire, about 1657, died Aug. 16, 1733. The son of a clergyman, he was educated at Lincoln and Exeter colleges, Oxford, took the degree of bachelor in 1676, and was elected to a fellowship at All Souls', which he retained through life. He was created LL.D. in 1685, and soon after became a Roman Catholic. As he returned to the church of England just before the revolution of 1688, he was charged with changing his creed according to his political interests. His own explanation was that he went to the university without religious opinions, adopted Catholicism without examination, and abandoned it upon reflection. After the revolution, of which he was a zealous partisan, he became an advocate, sat as judge in the court of delegates, and received a pension from the crown of £200. He had already produced several pamphlets in favor of the government, when in 1706 he published a volume entitled "The Rights of the Christian Church asserted, against the Romish and all other Priests that claim an independent Power over it." It was an elaborate attack on high church principles, and involved him in a controversy with William Wotton, Dr. Hickes, and others, which continued several years. He published two defences of it, and in 1709 reprinted them, and also two other essays on the law of nations and the liberty of the press. In 1710 he attacked the party of Dr. Sacheverell in a pamphlet entitled "New High Church turned Old Presbyterian;" but the house of commons on one day condemned Sacheverell's sermons, and on the next ordered Tindal's "Rights of the Christian Church" and the second edition of his "Defences" to be burned. This was the occasion of three more pamphlets from him, followed by many others in succeeding years on the current political questions. In a personal controversy between him and Walpole, after the resignation of the latter in 1717, several pamphlets were written on each side; but he was afterward an active defender of the ministry of Walpole. In 1728 he published two polemic "Addresses," in reply to pastoral letters of the bishop of London, Dr. Gibson. His most important work, "Christianity as Old as the Creation, or the Gospel a Republication of the Religion of Nature," appeared in 1730. It expressly denies that Christianity contains any truth which the human reason might not have discovered for itself, and by implication denies that it is a special revelation. "Under pretence," says Warburton, "of advancing the antiquity of Christianity, he labored to undermine its original." Among the many answers which it called forth were treatises by Waterland, James Foster, Conybeare, Leland, and Chapman. The last writings of Tindal were in its defence. He left a second volume of "Christianity as Old as the Creation," only the preface to which has been published.

TINDALE, William. See Tyndale.

TING-HAI, a town of China, province of Che-kiang, capital of the island of Chu-san, situated on the S. side of the island, in lat. 30° N., long. 122° 6′ E.; pop. 35,000. It stands in the valley of Yung-tung, about 900 yards from the beach, with which it is connected by a causeway and two canals about 4 feet deep. The city is strongly walled and fortified, nearly encircled by a canal 33 feet wide and 3 feet deep, and several canals traverse it in different directions. The streets are narrow and paved with granite, with sewers underneath. The chief public edifices are two temples dedicated to ancestors and to the guardian idol of the city. The suburb of Tau-tan extends along the shore and forms one long street, at the E. end of which is a hill surmounted by a temple. There are some manufactures, and cabinet making and carving are carried on. The harbor is one of the best on the coasts of China, and is accessible by 3 or 4 passages. Some trade exists. The city was bombarded and captured by the English in July, 1841, and again in October of the same year.

TINTORETTO, Il, an Italian painter, born in Venice in 1512, died there in 1594. He was the son of a dyer, and from the occupation of his father derived the name by which he is commonly known, his true name being Jacopo Robusti. His early instruction was acquired in the school of Titian, where, however, according to the common account, he remained but a short time in consequence of the jealousy or dissatisfaction of his master, who dismissed him with the remark that "he would never be any thing but a dauber." Undiscouraged by this harsh treatment, he commenced a rigorous course of self-instruction, and placed over the apartment in which he pursued his studies the inscription, *Il disegno di Michel Agnolo; il colorito di Tiziano* ("The drawing of Michel Angelo and the coloring of Titian"), as expressive of the principles he intended to follow. He was, however, of too vigorous and original a genius to rest contented with the reputation of a successful follower of either of these masters, but aspired to become the founder of a school, which should supply whatever was deficient in their styles. Beside copying the works of both, he was in the habit of designing from plaster casts by lamplight in order to acquire skill in the use of chiaroscuro, the result of which practice may be seen in the union of strong shadows with the rich Venetian coloring which gives so peculiar a character to his pictures. In like manner he improved himself in the science of perspective and foreshortening by suspending his models in various positions from the ceiling by means of cords. He soon rose into great reputation among the Venetians, ranking with Paul Veronese as one of the last of the great painters of the golden age of Italian art; and in his best period his quickness of invention and the facility and rapidity of his execution were unequalled perhaps by any painter. He sought rather than avoided difficulties, and is even said to have frequently dispensed with any preliminary design or sketch, and to have composed his picture as he went along, indicating with a few patches of color the liveliest forms and expressions, and crowding his canvas with a multitude of figures in every attitude that a fertile but reckless imagination could conceive. His performances are necessarily unequal, the grossest faults being frequently found in close proximity with the highest beauty; whence the remark of Annibale Carracci, that Tintoretto was sometimes equal to Titian, at others inferior to himself; and it may be said of his works generally, that, despite their grandeur, dramatic vivacity, brilliancy of coloring, and luxuriant invention, they are deficient in artistic arrangement and in the elevation which properly belongs to history. Consequently, among the amazing number of pictures which he produced, his portraits, giving less scope to the impetuosity of his genius, stand preëminent. He also exhibited the characteristic excellence of his school in landscape painting, the intensity of his imagination being such, according to Ruskin, that "there is not the commonest object to which he will not attach a range of suggestiveness almost limitless, nor a stone, leaf, or shadow, nor any thing so small, but he will give it meaning and oracular voice." History however was the department in which he chiefly delighted, and in which the characteristic excellences and defects of his style are most apparent; and upon his great historical pictures in Venice his reputation mainly rests. Elsewhere, it has been observed, most of his works exhibit only his infirmities. His masterpieces are undoubtedly the two immense compositions representing St. Mark rescuing a tortured slave from the hands of the heathen, and the "Crucifixion," both painted in his best period; the former, perhaps the finest picture in the world for action, is now in the academy of Venice, and the latter, described by Ruskin as "beyond all analysis and above all praise," in the Scuola di S. Rocco, where are also 61 other large compositions by Tintoretto, each containing many figures of the size of life. The doge's palace is almost equally rich in his works, and contains, among other remarkable pieces, a representation of paradise 84½ feet long and 34 feet high, painted, like almost every thing he produced, in oil. Nothing else on so vast a scale was probably ever painted on canvas. His frescoes are comparatively few. In the latter part of his life he degenerated into a corrupt style, chiefly remarkable for coarseness of invention and a slovenly mechanical execution, of which his "Last Judgment" and "Worshipping of the Golden Calf," in the church of Sta. Maria dell' Orto, are melancholy examples. The rapidity of invention and execution which gained him the name of *Il furioso Tintoretto*, and which Sebastian del Piombo well illustrated by saying that Tintoretto could do as much in two days as he could do in two years, seems never to have deserted him; and in the maturity of his powers he wrought so fast and at so low a price, that few of the contemporary painters of Venice could get employment. Many of his works were bestowed gratuitously upon convents, and for others he received barely sufficient to pay for the materials. Tintoretto has found an enthusiastic panegyrist in Ruskin, who has devoted considerable space to the description of his works. See "Stones of Venice," vol. iii. pp. 324–353.

TIOGA. I. A S. co. of N. Y., bordering on Penn., and intersected by the North branch of the Susquehanna river; area, 480 sq. m.; pop. in 1860, 28,739. The surface is very hilly and the soil generally fertile. The productions in 1855 were 260,074 bushels of Indian corn, 452,978 of oats, 21,293 of wheat, 25,884 of rye, 91,402 of buckwheat, 150,518 of potatoes, 169,183 of apples, 38,401 tons of hay, 1,365,783 lbs. of butter, and 80,144 of wool. There were 2 furnaces, 17 grist mills, 146 saw mills, 13 tanneries, 45 churches, and 4 newspapers, and in 1859 10,875 pupils attending public schools. The North branch is navigable in this county, and immense quantities of timber are annually floated to market. It is intersected by the Erie and the Cayuga and Susquehanna railroads. Capital, Owego. II. A N. co. of Penn., bordering on N. Y., and drained by the Tioga river and its affluents; area, about 1,100 sq. m.; pop. in 1860, 31,045. The surface is hilly and heavily timbered, and the soil better adapted to grazing than tillage. The productions in 1850 were 141,896 bushels of wheat, 147,140 of Indian corn, 800,017 of oats, 158,289 of potatoes, 87,614 tons of hay, 724,281 lbs. of butter, and 202,851 of maple sugar. There were 18 grist mills, 102 saw mills, 2 iron founderies, a furnace, 3 woollen factories, 12 tanneries, 22 churches, 4 newspapers, and in 1860, 9,438 pupils attending public schools. Iron ore is found, and bituminous coal is abundant, of which large quantities are transported to Buffalo, N. Y., by the Corning and Blossburg railroad. Capital, Wellsborough.

TIPPAH, a N. co. of Miss., bordering on Tenn., drained by the Hatchie, Wolf, and Tallahatchie rivers and Tippah creek; area, 1,050 sq. m.; pop. in 1860, 22,550, of whom 6,331 were slaves. The surface is undulating and the soil fertile. The productions in 1850 were 865,131 bushels of Indian corn, 83,440 of oats, 125,675 of sweet potatoes, and 12,098 bales of cotton. There were 80 churches, and 202 pupils attending public schools. Capital, Ripley.

TIPPECANOE, a river of Indiana, which rises in a lake of the same name in Kosciusko co., and flows in a general S. W. direction into the Wabash river 9 m. above Lafayette, Tippecanoe co. Its length is about 200 m. It is famous for the battle fought on its banks, Nov. 5, 1811, in which the Americans under Gen. Harrison defeated the Indians under Tecumseh's brother the prophet.

TIPPECANOE, a W. co. of Indiana, intersected by the Wabash river, and drained by the Tippecanoe river and several creeks; area, 500 sq. m.; pop. in 1860, 25,765. The surface is generally level, and the soil a rich black loam. The productions in 1850 were 1,838,311 bushels of Indian corn, 68,259 of wheat, 95,038 of oats, and 6,871 tons of hay. There were 32 churches, 5 newspapers, and 2,042 pupils attending public schools. It is intersected by the Toledo and Wabash, the New Albany and Salem, and the Lafayette and Indianapolis railroads, and by the Wabash and Erie canal. Capital, Lafayette.

TIPPERARY, a county in the province of Munster, Ireland, bounded by the counties of Galway, King's, Queen's, Kilkenny, Waterford, Cork, Limerick, and Clare; area, 1,659 sq. m.; pop. in 1861, 247,496. The chief towns are Clonmel, Carrick-on-Suir, Nenagh, and Tipperary, the capital. In the N. part a range of mountains extends completely across from the Shannon to King's county, and there are several groups in other parts of the county, the highest of which does not exceed 3,000 feet above the sea. The principal rivers are the Shannon, which flows along the W. boundary, and the Suir on the S. With the exception of the portion of Lough Derg which is in Tipperary, all the other lakes are small. The soil of the level country is a rich loam of great fertility. There are large numbers of horned cattle in Tipperary, and butter is extensively made and exported. Coal, copper, and lead are found; and slates are extensively worked. The county returns two members to parliament.

TIPPOO SULTAN, or TIPPOO SAHIB, the last independent sovereign of Mysore, born in 1749, killed at Seringapatam, May 4, 1799. The son of Hyder Ali, he was first known by the appellation of Feth Ali Khan, was carefully educated, distinguished himself by great personal bravery and military ability as a commander in the war against the English, and succeeded his father, Dec. 7, 1782. He at once gave a new impulse to the war, took Bednore and other cities, and concluded a peace, March 11, 1784, on advantageous terms to himself. He now assumed the title of sultan, and even the superior one of padishah, although he was but a nabob or lieutenant of the Great Mogul, Shah Allum; and his court, in point of magnificence and splendor, outshone that of any other oriental prince. He meanwhile unsuccessfully courted an alliance with France, 1787–'8, and subdued the Nairs of Malabar, carrying off from that province, it is said, 70,000 Christians, and forcing 100,000 Hindoos to become Mohammedans. Under a flimsy pretext, in April, 1790, he broke the treaty with the English by invading the territory of their ally, the rajah of Travancore. The English in turn invaded Mysore, took several of his strongholds, were joined by the Mahrattas and the subahdar of the Deccan, and, under Cornwallis and Abercromby, besieged him in Seringapatam, his capital. He was now forced to sue for peace, which was concluded, Feb. 24, 1792, Tippoo agreeing to pay within a year 33,000,000 rupees, to give up to the allies nearly half of his dominions, and to deliver two of his sons as hostages. Burning with a desire for revenge, he tried to arouse several Indian princes against his conquerors, entered into secret negotiations with the French governor of Mauritius, and even sent ambassadors to Gen. Bonaparte, who had landed in Egypt, meanwhile increasing the number and efficiency of his troops, enlisting foreign officers, and making every preparation for a renewal of hostilities. The marquis of Wellesley, then governor-general of India, discovering his intrigues and ultimate designs, ordered him to dismiss his French auxiliaries and desist from arming his subjects, and on his refusal gave orders for the invasion of Mysore, Feb. 3, 1799. Two English armies, under Gens. Stuart and Harris, advanced, and defeated the Mysoreans in two encounters, at Sidasir and Malaveli; and the sultan himself was obliged to take refuge in Seringapatam. That city was stormed by the army under Gen. Harris, and Tippoo himself was killed while fighting on the ramparts. The conquerors gave up a part of his dominions to their allies, assigned to his family the stronghold of Vellore in the presidency of Madras as their residence, with an annual income of 720,000 rupees, and nominally placed the government in the hands of a native prince, though it was actually vested in the British residents at Mysore.

TIPTON. I. A central co. of Ind., drained by Cicero and Buck creeks; area, 280 sq. m.; pop. in 1860, 8,171. The surface is level and the soil fertile. The productions in 1850 were 151,961 bushels of Indian corn, 8,487 of wheat, 7,715 of oats, and 918 tons of hay. There were 9 or 10 churches, and 264 pupils attending public schools. It is intersected by the Peru and Indianapolis railroad. Capital, Tipton. II. A W. co. of Tenn., bordering on the Mississippi river, and bounded N. by the Hatchie; area, 370 sq. m.; pop. in 1860, 10,704, of whom 5,288 were slaves. It has a level surface and fertile soil. The productions in 1850 were 439,785 bushels of Indian corn, 48,429 of potatoes, 6,611 bales of cotton, and 84,756 lbs. of butter. There were 11 churches, and 295 pupils attending public schools. Its S. E. corner is intersected by the Memphis and Ohio railroad. Capital, Covington.

TIRABOSCHI, GIROLAMO, an Italian literary historian, born in Bergamo, Dec. 28, 1731, died in Modena, June 3, 1794. He was educated in the Jesuit college of Monza, became a member of that order, and about 1766 was appointed professor of rhetoric in the university of Milan. In 1770 he was made librarian of the duke of Modena, and employed the facilities thus afforded him in preparing his great work, *Storia della letteratura Italiana* (13 vols., Modena, 1772–'82; best edition, 16 vols., Milan, 1822–'6), which comprises the literary history of Italy from the earliest times down to the 17th century. As a reward for his labors he was made by the duke of Modena a knight and a member of his council in 1780. Tiraboschi was also the author of many other literary, historical, and biographical works.

TIRESIAS, the great soothsayer of Greek legendary history, born in Thebes. He was the son of Eueres and Chariclo, and was fabled to have lived through 9 generations of men, but was blind from his 7th year. His loss of sight was ascribed by one account to the fact that he disclosed to mortals what they should not know; by another, to his having seen Minerva bathing, who thereupon blinded him by sprinkling water upon his face. When Chariclo complained of the severity of the punishment, the goddess, unable to restore his sight, gave him a staff by which he could safely guide his steps, and the ability to comprehend the voice of birds and thus know futurity. In the mythic history of Greece Tiresias appears in events widely separated in time and place, and even in the lower world he was represented as still retaining his prophetic power. His oracle was at Orchomenus.

TIRYNS, one of the oldest cities of Greece, situated in Argolis, 2 m. from Nauplia. Its walls, which were popularly attributed to the Cyclops, are the finest existing specimens of the military architecture of the heroic age of Greece. Pausanias said that these were no less worthy of admiration than the pyramids of Egypt, and were constructed of stones so large that a yoke of oxen could not stir the least of them, the spaces between them being filled up with smaller stones. The ruins at present occupy the lowest hill of several which rise out of the plain, and the entire circuit of the walls enclosing the citadel is still preserved to some extent, being from 20 to 25 feet wide and ¼ of a mile in circumference. On the E. side of the hill are two towers, and the S. E. part of the wall has a remarkable covered gallery 86 feet in length and 5 feet in breadth. The origin of Tiryns belongs to the mythical period, and in 468 B. C. it was entirely destroyed by the Argives, so that no trace of the city now remains except the fortifications. It is now called Tirynthus. It was famed in Greek legendary history as the birthplace, according to some accounts, of Hercules, and the royal seat of Perseus.

TISCHBEIN, JOHANN HEINRICH, a German painter, born at Haina, near Frankenberg, Oct. 3, 1722, died in Cassel, Aug. 22, 1789. Having studied several years under Vanloo in Paris, and subsequently practised his art in Italy, he settled in 1752 at Cassel. He was highly esteemed as a painter of history and mythology. His works are numerous in Germany.—JOHANN HEINRICH WILHELM, a German painter, nephew of the preceding, born at Haina, Feb. 15, 1751, died at Eutin, Oldenburg, July 26, 1829. After gaining some local reputation as a painter of history and landscape, he went in 1781 to Italy, resided 6 years in Rome, and then settled in Naples, where he was appointed director of the academy and rose to the head of his profession. At the breaking out of the Neapolitan revolution in 1799 he returned to Germany. He painted mythological subjects, and excelled in drawing animals; but he is chiefly known at the present day by three elaborate illustrated works: *Têtes des différents animaux dessinées d'après nature* (2 vols. fol., Naples, 1796); "A Collection of Ancient Vases, &c., in the possession of Sir William Hamilton" (4 vols. fol., Naples, 1790), the plates of which, 214 in number, were engraved from Tischbein's designs; and "Illustrations of Homer from Antiques, with Explanations by Heyne" (fol., Göttingen, 1801–'4).

TISCHENDORF, LOBEGOTT FRIEDRICH KONSTANTIN, a German theologian, born at Lengenfeld, Saxony, Jan. 18, 1815. He studied philosophy and theology at the university of Leipsic from 1834 to 1838, and in 1840 was aided by the government of Saxony in making a literary journey through England, France, and Holland, for the purpose of collating the ancient manuscripts of the original text of the Greek Testament, with a view to preparing a thoroughly revised critical edition. In 1843 and 1844 he visited Switzerland, southern France, Italy, Malta, Egypt, Libya, Palestine, Syria, Asia Minor, Constantinople, and Greece, and on his return thoroughly searched the libraries of Vienna and Munich. An important result of this journey (which he described in the work

Reise in den Orient, 2 vols., Leipsic, 1845–'6), beside the information obtained on the libraries of the eastern countries, was a large and most valuable collection of ancient Greek, Syriac, Coptic, Arabic, Georgian, Ethiopian, and Druse manuscripts. A facsimile of a Greek manuscript of the Old Testament, which Tischendorf considered the most ancient manuscript on parchment in Europe, was published at Leipsic in 1846. In 1845 Tischendorf was appointed extraordinary, and in 1850 ordinary professor of theology at Leipsic. In 1849 he made another journey through France and England, and in 1853 in the East, visiting especially Egypt and Mount Sinai, and bringing home another collection of valuable Greek, Arabic, Syriac, and Caraitic manuscripts. Beside that above mentioned, he has published a number of old Greek manuscripts of the New Testament, as *Codex Ephraemi* (Leipsic, 1843 and 1845); *Monumenta Sacra Inedita* (1846); *Evangelium Palatinum Ineditum* (1847); *Codex Amiatianus* (1850 and 1854); *Codex Claromontanus* (1852); and *Fragmenta Sacra Palimpsesta* (1854); and also several editions of the Greek Testament, embodying the results of his critical researches. His critical edition of the Septuagint was published in 1850. He has also devoted much attention to the literature of the Apocrypha, and published extensively on that subject. In 1858 and 1859 he made another literary journey in the East at the expense of the Russian government, and in the convent of St. Catharine at Mount Sinai found a manuscript on vellum, containing, beside many parts of the Old Testament, the Epistle to Barnabas, and the Pastor of Hermas, the entire New Testament, being among all the manuscripts of the New Testament extant from the 4th to the 9th century the only complete one. Tischendorf considers this newly found manuscript, which he calls *Codex Sinaiticus*, more important than any other heretofore known. Its publication has been announced for 1862.

TISHEMINGO, a N. E. co. of Miss., bordering on Tenn. and Ala., bounded N. E. by the Tennessee river, and drained by the Tuscumbia and affluents of the Tennessee and Tombigbee rivers; area, 1,400 sq. m.; pop. in 1860, 24,149, of whom 4,981 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 526,769 bushels of Indian corn, 50,704 of oats, 73,990 of sweet potatoes, and 3,945 bales of cotton. There were 47 churches, 2 newspapers, and 490 pupils attending public schools. It is traversed by the Mobile and Ohio and the Memphis and Charleston railroads. Capital, Jacinto.

TISSAPHERNES, a Persian statesman and general, killed in Colossæ, Phrygia, in 395 B. C. He first appears in history as sent by Darius Nothus in 414 to quell the revolt of Pissuthnes, satrap of Lower Asia, and in pursuance of this object made a treaty with the Spartans, who assisted him in the capture of Amorges, the son of Pissuthnes. The alliances made by the Greeks with the treacherous Persian were never of long duration, as he managed his power so as not to render either Athens or Sparta completely triumphant, and thus made himself an object of suspicion and dislike to both parties. In 407 Cyrus the Younger was appointed viceroy of the maritime region of Asia Minor. A mutual hostility soon sprang up between the prince and the satrap, and after the death of Darius the latter accused the former of aspiring to the throne of his brother Artaxerxes. Involved in constant disputes and wars with the prince, he was the first to reveal to the king the news of Cyrus's intended expedition, and at the battle of Cunaxa in 401 was one of the 4 generals who commanded the Persian army. He gained possession, by treachery, of the persons of the 5 generals commanding the Greek mercenaries of Cyrus, put them to death, and during the famous retreat of the 10,000 under Xenophon continually harassed them on their march as far as the Carduchian mountains. For his services Tissaphernes, in addition to his own satrapy, was made governor of the provinces ruled by Cyrus, and in this position carried on a war with the Spartan generals Thimbron, Dercyllidas, and Agesilaus, by the last of whom he was outmanœuvred and badly beaten. Complaints against the timid and treacherous satrap were now sent to the Persian court, and these were supported by the influence of Parysatis, the queen mother, who wished to revenge the death of her favorite son Cyrus; and Tithraustes was accordingly sent down to put Tissaphernes to death. The disgraced satrap was surprised in the bath, slain, and his head sent to Artaxerxes.

TISSOT, SIMON ANDRÉ, a Swiss physician, born in the canton of Vaud in 1728, died near Lausanne, June 15, 1797. He was educated at the universities of Geneva and Montpellier, and about 1750 established himself in Lausanne, where he rapidly rose to great eminence as a practitioner and professor in the university. Having declined various flattering offers from foreign courts and universities, he in 1780 accepted the professorship of clinical medicine in the university of Pavia, tendered to him by the emperor Joseph II.; and during his residence there the students, in consequence of his successful treatment of an epidemic bilious fever, caused a marble inscription, commencing with the words *Immortali Præceptori*, to be placed under the portico of the school. In 1783 he returned to Switzerland. His works, of which a complete edition was published by J. N. Hallé (11 vols. 8vo., Paris, 1811), comprise *Avis au peuple sur la santé* (12mo., Lausanne, 1761), which has been translated into every European language and frequently reprinted; *De Valetudine Literatorum* (1766), also frequently reprinted; *Essai sur les maladies des gens du monde* (Nuremberg, 1770); *Traité des nerfs et de leurs maladies* (4 vols., Lausanne, 1778), and numerous other treatises. He also edited Morgagni's works, with a memoir.

TITANIUM, a metal first detected in 1791 by Gregor in titanic iron, and found by Klaproth in 1794 in rutile, and named by him from the Titans. Dr. Wollaston in 1822 recognized it in the form of minute copper-colored cubical crystals found in the slags of the iron smelting furnaces at Merthyr Tydvil in South Wales, and these, often met with since that time in iron slags, have been until recently regarded as pure titanium, but are now understood to be compounds of the metal with nitrogen and cyanogen. Berzelius was the first to separate this metal in a state of purity. He did this by decomposing a mixture of the fluorides of titanium and potassium by means of metallic potassium, and obtained the metal in a grayish powder. M. St. Clair Deville obtained it in forms resembling specular iron ore, crystallized in prisms with a square base. Its chemical equivalent is 25; symbol Ti. Three oxides of the metal are known, TiO, Ti_2O_3, and TiO_2; the last of which, titanic acid, is the only one of interest. It occurs as a mineral in 3 forms: as rutile and anatase, which both crystallize in the dimetric system, though with different angles, and as brookite, crystallizing in the trimetric system. Rutile is generally a reddish brown mineral, sometimes yellowish or black, harder than feldspar, and of specific gravity 4.18 to 4.25. It occurs in many parts of Europe and America, the richest localities in the United States being in Chester and Lancaster cos., Penn. In Vermont and New Hampshire, as also in Brazil and Switzerland, it is found in long needles enclosed in masses of transparent quartz, making very curious and beautiful specimens, which are often used in jewelry. Anatase and brookite are comparatively rare minerals. In combination with oxide of iron, titanic acid forms the compound ilemnite or titaniferous iron, of which as an iron ore mention is made in the article Iron. This is met with in large masses in Maryland, northern New York, and Canada. At Bay St. Paul on the St. Lawrence are beds of it, from 100 to 300 feet long and 90 feet thick, the ore, according to Mr. T. S. Hunt, containing 48.60 per cent. of titanic acid combined with 37.06 of protoxide of iron, 10.42 of peroxide of iron, and 3.60 of magnesia.—The only useful application of titanium is to furnish a yellow color in porcelain painting, and to give the proper tint to artificial teeth. The American supply for these purposes is derived from Pennsylvania.

TITANS AND TITANIDES, in Greek mythology, the sons and daughters of Uranus (Cœlus) and Gæa (Terra). The names of the Titans were Oceanus, Cœus, Crius, Hyperion, Iapetus, and Cronos (Saturn); those of the Titanides, Theia, Rhea, Themis, Mnemosyne, Phœbe, and Tethys. According to the Hesiodic account, Uranus feared his offspring, and as fast as they were born confined them in the cavities of the earth; and Gæa, who could not make room for them, produced iron and endeavored to persuade them to free her and themselves from this oppressive treatment. Cronos alone had the courage to undertake the deed, and, armed with a sickle made by his mother, emasculated his father, and thus secured liberty and power for himself and his brothers. Marrying his sister Rhea, he begat 3 sons and 3 daughters, but, having been told that he would be destroyed by one of his own children, swallowed them as soon as they were born. Rhea by the aid of Uranus and Gæa concealed Zeus (Jupiter), the youngest, in a cavern on Mt. Ida, giving to Cronos instead a stone wrapped in swaddling clothes. When Zeus had grown up, he was enabled by stratagem to make his father vomit up the stone and the 5 children he had swallowed, and now determined to wrest the supreme power from the hands of Cronos and the Titans. Supplied by the Cyclops with thunder and lightning, and aided by the Centimanes, he carried on a war against the Titans for 10 years, himself and his allies occupying Olympus, while the opposing gods were encamped on Mt. Othrys. At length Zeus triumphed. The Titans, with the exception of Oceanus, were confined for ever in a subterranean dungeon, where a wall of brass was built about them by Poseidon (Neptune), and where they were guarded by the Centimanes.—The name of Titans was also given to those beings who were their descendants, such as Prometheus, Hecate, and others.

TITHES, a tax of one tenth of the increase of crops, stock, and avails of personal industry, formerly and still in some countries levied for the support of the officers of religion, religious worship, or the assistance of the poor. This tax seems to have been of patriarchal origin (Gen. xiv. 20), and existed in many of the nations of antiquity. Under the Jewish theocracy the tenth part of the increase of the property of the Jews was accorded to the Levites, as a substitute for the landed inheritance they forfeited by their consecration to the temple worship, and also as a compensation for their services. Other tithes were also prescribed for the sacrifices of the temple, and at particular periods for the poor. (See Taxes.) The early Christian church adopted voluntarily the custom of consecrating to religious purposes the tenth of the income; and it was not till after the church wielded the temporal power that tithes were the subject of legal enactment. It was during the dark ages extended over the greater part of Catholic Europe. In France, Charlemagne established them by decree in the 8th century. In England the first law in relation to them is believed to have been that of Offa, king of Mercia, who brought the civil power to the aid of the clergy in collecting their tithes. This was subsequently extended over the whole of England by Ethelwulf. In the 9th century they were also made legally obligatory in Scotland, and not long after in Ireland. At first they were paid to whatever church the payer chose, but the decretal of Pope Innocent III. directed their payment to the parsons of the respective parishes in which they arose. Tithes were by the ecclesiastical law divided into 3 kinds: "prædial," or such as arose immediately from the ground, like grain of all kinds, fruits, herbs, grasses, hops, wood, &c.; "mixed," natural products, but nurtured and preserved in part by the care of man, such as wool, milk, pigs, butter, cheese, &c.; and "personal," as of manual occupations, trades, fisheries, and the like. The first two kinds are payable in gross, but of the third class only the tenth part of the clear gains and profits is due. In France, Charlemagne divided the tithes into 4 parts, one to maintain the edifice of the church, another to support the poor, a third to maintain the bishop, and a fourth the parochial clergy. By the original law in England, all lands except those of the crown and of the church itself were tithable; but at the reformation many of the forfeited church lands when sold were specially exempted, and some were also exempted by composition and some by prescription. These partial exemptions only made the burden more galling to those who were compelled to pay; and as the tithes were a tax for the support of the clergy of the established church, it was particularly annoying to dissenters, and has been for the past 150 years a constant subject of complaint. Until the reign of William IV. the payment of tithes might be exacted in kind, but by the act of 6 and 7 William IV. c. 71, a board of commissioners was appointed for the purpose of converting them into a rent charge payable in money, but varying annually according to the average price of corn for the preceding 7 years. They have now been thus converted throughout the greater part of England, and their former amount somewhat reduced; but the amount raised from them still exceeds $10,000,000. In Ireland they have been compounded at ¾ their former estimated value. In France tithes were abolished at the revolution, and this example was followed afterward by the other continental states. The Greek church has recommended, but never legally enforced, the payment of tithes. In the United States tithes are only exacted by the Mormon hierarchy, and among them the system bears a close resemblance to that of the Jewish theocracy.

TITIAN (Tiziano Vercelli), an Italian painter, born in Cadore, Friuli, in 1477, died in Venice, Sept. 9, 1576. He displayed in infancy a remarkable predilection for painting, and is said to have made his first attempts at coloring with juices expressed from flowers. At 9 years of age he was placed under Sebastian Zuccati, a Venetian painter and worker in mosaic, whom he left to enter the school of the Bellini, in which he acquired the essential elements of his art, with somewhat of the antiquated manner of his masters. He also came probably under the influence of Albert Dürer, who visited Venice in 1494 and again in 1507, but was indebted chiefly to his friend and fellow pupil Giorgione for those ideas of art and color, reflecting the cheerful enjoyment of life and its splendor, which thenceforth characterized the productions of the Venetian school. For a time the two young painters were bound to each other by the closest ties of friendship; and such was the overpowering influence of Giorgione's genius and personal character, that it was not until he had entered far into manhood that Titian can be said to have shown any decided originality. At Giorgione's death in 1511 the styles of the two artists were so closely assimilated that it was difficult to distinguish their productions, and hence it was a comparatively easy, as it was a natural task, for Titian to complete the unfinished works of his friend. A new era thenceforth commenced in his development. Perceiving that breadth of form produced breadth of color, he endeavored to see nature in a more ample light, and, instead of copying or imitating her tones, to generalize and elevate them in accordance with his own original conceptions. The result was a free and serene beauty of form and expression, and a representation of life realizing what Kugler calls "the glorification of earthly existence, and the liberation of art from the bonds of ecclesiastical dogmas." Left at the age of 35 without a rival worthy of competing with him, Titian immediately entered upon a career which for the uniform excellence of its productions, for celebrity and duration, has perhaps no parallel in the history of painting. Commissions from the wealthy Venetian nobility afforded him abundant employment at home, and for two years subsequent to 1514 he resided at the court of Duke Alfonso I. of Ferrara, for whom he painted three celebrated mythological pictures, the "Arrival of Bacchus in the Island of Naxos" and "A Sacrifice to the Goddess of Fertility," both of which are now in the gallery at Madrid; and the "Bacchus and Ariadne" in the British national gallery, which presents on a small scale an epitome of all the characteristic beauties of Titian in composition, color, and form. At Ferrara he also painted portraits of the duke's wife, the celebrated Lucrezia Borgia, and of Ariosto. In 1516 he was back in Venice, having resisted a pressing offer from Leo X. to visit Rome, where Raphael was then executing his grand series of frescoes in the Vatican, and one also from Francis I. of France; and for a number of years he was too fully occupied with the commissions of local patrons to find time to practise his art abroad. In 1530, however, he repaired to Bologna, where the emperor Charles V. and Pope Clement VII., each surrounded by a brilliant court, had met in conference; and through the influence of the cardinal Ippolito de' Medici, the pope's nephew, he was enabled to paint the portraits of both potentates. The emperor, whom he represented on horseback, with lance in rest, loaded him with honors and rewards; and after a brief residence in Mantua, where among other works he executed for Federico Gonzaga portraits of 11 of the 12 Cæsars, Titian returned to Venice. In 1532 he was again in Bologna at the request of the emperor; and between 1532 and 1535, according to the commonly received account, he resided in Spain, where he is said to have executed the most important of his works now in that country. Later researches, however, have rendered it doubtful whether he ever visited Spain at any time. His style of living had hitherto been frugal and unpretending, notwithstanding the great reputation he enjoyed throughout southern Europe; but as he approached old age he began to live with splendor. The most powerful princes of Europe were eager for specimens of his art, and their demands, together with his own enthusiasm, afforded constant incentives to his industry. At 65 years of age he retained the vigor and freshness of youth, while the magic charm of his color and the cheerful serenity of his style seemed to mellow with time. He was the intimate friend of the poet Aretino and the architect Sansovino, and his position as painter to the republic brought him into familiar relations with the chief aristocracy of Venice. In 1543-'5 he revisited Bologna and Ferrara, where he painted the emperor Charles V. for the 3d or 4th time, and Pope Paul III.; and after passing some time in the employment of the duke of Urbino, he repaired to Rome. His finest production here was the picture of the old pope with his nephews, Cardinal Farnese and Duke Ottavio Farnese, which is in every respect a masterpiece of historical portraiture. While engaged in this city upon a picture of Jupiter and Danaë, he was visited by Michel Angelo, who, after expressing admiration of his coloring, observed that if he had been early grounded in the principles of drawing, he would rank as the first painter in the world. In 1548 he was summoned by Charles V. to Augsburg, where he was created a count palatine of the empire (although this distinction is also said to have been conferred upon him during his alleged residence in Spain), and placed on the imperial pension roll. After the abdication of Charles he continued in great favor with his successor Philip II. of Spain, for whom he painted a number of important works; but his pension was thenceforth constantly in arrears, and he was frequently obliged to petition the Spanish officials for the sums due him for pictures. The remainder of Titian's life was passed principally in Venice, but it was long before his pencil gave indications of the weakness or timidity of age. His "Martyrdom of St. Lawrence," in the Jesuit's church in Venice, painted when he was 81, is one of his largest and grandest compositions; and at least one of his celebrated Magdalens, that in the Escurial, was executed even later. At 90 years of age sorrow rather than time began to affect him, and, notwithstanding he clung resolutely to his art for consolation, the vigor and beauty of his style became impaired. In his 97th year he received Henry III. of France, who passed through Venice on his way from Poland, with a magnificence of hospitality and a courtly grace of manner which charmed all beholders; and two years later, while yet occupied with his art, he fell a victim to the plague, the fatal consequences of which he might have escaped had the nature of the distemper been understood by the Venetian physicians. His latest work, a dead Christ with the Virgin and attendant saints, now in the academy of Venice, "shows certainly," says Kugler, "that his hand trembled beneath the weight of ninety and nine years; but the conception of the subject is still animated and striking, the colors still glowing, while, Titian-like, the light still flows around the mighty group in every gradation of tone." By a special exception in his favor he was buried in the church of Santa Maria de' Frari, where a black marble slab, inscribed "Tiziano Vercellio," marks his resting place.—The works of Titian comprise sacred and profane history, mythological subjects, portraits, and landscapes, the last named being generally treated in connection with other subjects, though not always in subordination to them. His long life and unceasing industry will account for the enormous number of pictures passing under his name distributed among the galleries of Europe, many of which, however, are not well authenticated. He is still seen to the best advantage in Venice. Of his early pictures, which reflect the style of the Bellini modified by the peculiar ideas derived from Giorgione, the most noticeable are the "Visit of Mary to Elizabeth," in the academy at Venice; the *Vierge au Lapin*, in the Louvre; the "Christ with the Tribute Money," at Dresden; and particularly the "Resurrection," painted in 5 compartments, in the church of S. Nazzaro, at Brescia. The more developed period which succeeded the death of Giorgione comprises nearly all the pictures by which he is now known, and of these only the chief ones can be here designated. The first in celebrity of these perhaps is the "St. Peter Martyr," in the church of S. Giovanni e Paolo in Venice, which ranks with the "Martyrdom of St. Lawrence" among the painter's masterpieces, and which, for invention, action, and the grandeur of the landscape, has always been considered of the first order of excellence. The academy of Venice contains his "Assumption" and "Presentation of the Virgin," and the Manfrini palace in the same city the "Entombment of Christ," which Kugler considers "perhaps the most important of Titian's pictures, and the noblest representation of the subject." In addition to these may be mentioned the "Last Supper," in the Escurial, upon which the artist informed Philip II. he had labored 7 years; a "Virgin and Child with Saints," in the Uffizi gallery; the "St. Sebastian," in the Vatican; the "Christ crowned with Thorns," in the Louvre; various well known Magdalens in Rome, Florence, the Escurial, and elsewhere; and numerous Madonnas, Holy Families, and similar pieces scattered over Europe. Upon subjects taken from allegory and secular history he executed several important pictures, including the "Victory of the Venetians over the Janizaries," for the doge's palace, which were destroyed by fire. As a colorist merely Titian developed the resources of his art with most success in the naked female figures which are so frequently met with in his mythological pictures; although he is here not unfrequently betrayed into an ostentatious exhibition of his mastery over his materials. Of this class of his works the most familiar examples are the several Venuses in the galleries of Florence and Dresden; the Danaës at Naples and Vienna; the Flora in the Uffizi gallery; "Diana and her Nymphs" and "Venus rising from the Sea," in the Stafford gallery; "Venus and Adonis" (a duplicate), in the British national gallery; and the so called *Venus del Pardo* in the Louvre. In the romantic symbolical style developed by Giorgione he produced many pictures combining his characteristic excellences as a painter of landscape and figures, of which the "Three Ages" in the Bridgewater collection, and "Sacred and Profane Love" in the Borghese palace, may serve as examples. As a portrait painter he is still unrivalled, whether we consider the "senatorial dignity" of his old Venetian nobles, "by the side of whom all modern gentlemen look poor and small," or the glowing beauty and happy consciousness of existence which characterize the celebrated female portraits known as "Titian's Mistress," in the Louvre, *La bella di Tisiano* in the Uffizi gallery, and the various "Titian's Daughters," all widely known through copies. Nearly every great potentate of Europe of the 16th century was painted by him; and soldiers, statesmen, poets, and ecclesiastics almost without number were among his sitters. The list includes Charles V., of whom he executed several portraits; his successors Ferdinand I. and Rudolph II.; Philip II. of Spain, whom he also painted several times; Francis I. of France; the sultan Solyman II. and his wife Roxana; Popes Clement VII., Paul III., and Paul IV.; all the doges of his time; Francesco, duke of Urbino, and his duchess, Eleonora; the constable de Bourbon; the cruel duke of Alva; Andrea Doria, doge of Genoa; Cesare Borgia; Count Castiglione; Cardinals Ippolito de' Medici, Bembo, Sforza, and Farnese; the poets Ariosto, Aretino, Fracastaro, and Bernardo Tasso; the architect Sansovino, and many others, the whole comprising a collection which would form a complete historical gallery illustrative of the times in which he lived. Lastly, as Fuseli has remarked, "landscape, whether it be considered as the transcript of a spot, or the rich combination of congenial objects, or as the scene of a phenomenon, dates its origin from him."

TITICACA, Lake, in the republic of Bolivia, South America, occupies the centre of one of the most remarkable terrestrial basins known on the globe. It is 160 m. long and from 50 to 80 broad, and discharges through the valley of El Desaguadero, to the S. E., into another lake called Lake Aullagas, which is probably kept at a lower level by evaporation or filtration, since it has no known outlet. The surface of the lake is 12,846 feet above the sea, and it is the most elevated body of water of similar size in the world. It has been sounded to the depth of 120 fathoms, but is supposed to be much deeper. The level of its waters has decreased very much in the historical period; and it is evident that they once surrounded the elevation supporting the ruins of Tiahuanico, 12 m. distant. Vast quantities of rushes grow on the shores of the lake, frequented by water fowl, and 7 or 8 varieties of fish are peculiar to its waters. Its W. side is barren, excepting in gold-washings and mines of silver and copper. On the E. shore, maize, wheat, and the fruits of the temperate zone flourish in great perfection, and here also are found considerable quantities of timber. Although far removed from the ordinary channels of travel and trade, almost inaccessible, and in parts stony and sterile, the country bordering Lake Titicaca supports a population of more than 1,000,000. It seems to have been the seat of the highest and most ancient civilization of South America, and of a people who have left gigantic monuments of their power and skill. (See Tiahuanico.) It was from this centre, according to the traditions of the Incas, that the great lawgiver and teacher of the Peruvians, Manco-Capac, diffused his influence; and it has also been maintained that here was the original seat of the Aymara or Inca race.

TITLARK, the popular name of the small dentirostral birds of the sub-family *motacillinæ* and genus *anthus* (Bechst.). They resemble the larks in their markings and in the long hind claw, and the wagtails in their movements and habits on the ground, and evidently are intermediate between these sub-families. In this genus the bill is rather straight and slender, with the tip notched; wings very long, the first 3 quills equal and longest, and the tertials nearly as long as the primaries; tail moderate and slightly notched; tarsi and toes long and slender, the hind toe long with a very long sharp claw. The species are numerous, inhabiting most parts of the world and in every variety of region, some being migratory, others permanent residents. The nest is made upon the ground, of dry grass and stalks, lined with finer plants and hair, and the eggs are 4 to 6. The American titlark (*A. Ludovicianus*, Licht.) is 6½ inches long and 11 in alar extent; olive brown above, each feather darkest in the middle; beneath yellowish brown, the sides of the neck spotted longitudinally with dark brown; around eyes and superciliary stripe yellowish; central tail feathers like back, the others blackish brown, the external one mostly white and a white spot at the end of the 2d; primaries edged with whitish, and the other quills with pale brownish; bill and feet black. It is very generally distributed over North America, extending to the Pacific and to Greenland, and is accidental in Europe. The flight is exceedingly easy and graceful; it occurs in flocks of tens or hundreds, running fast on the ground, vibrating the tail whenever it stops, not squatting like the larks, but moving the body on the upper joints of the legs; it often alights on fences and branches, walking on them with ease. It is found in the fields, on the prairies, along rivers, and on the sea shore; the notes are clear and sharp tweets, the last much prolonged; it breeds as far N. as Labrador, both sexes incubating, and sitting so closely as almost to allow themselves to be trodden upon before flying; the eggs are 6, ⅘ by ⅗ inch, reddish brown, with darker dots and lines at the larger end. It is very similar to the *A. obscurus* and *spinoletta* (Bechst.) of Europe, though the latter has a longer bill and less slender tarsi and toes, and has no yellowish superciliary stripe; the outer tail feathers are not white, and the spots are less distinct below.—The Missouri titlark (*neocorys Spraguei*, Sclater) is 5½ inches long and 9½ in extent of wings; it is a stouter bird than the last, with shorter bill and tail and larger feet and hind toe; the 1st quill is the longest; it is wood-brown above, the feathers light-edged, and dull white below, with less numerous spots on the breast; the legs and bill are yellow. It is found in Nebraska, and in song and habits comes the nearest of American birds to the European skylark.—Among the European species the most extensively distributed is the meadow titlark or pipit (*A. pratensis*, Bechst.), also called titling; it is 6¼ inches long and 9¾ in alar extent, olivaceous above, spotted with dusky; brownish white below, tinged anteriorly with red; neck, sides, and fore part of breast with oblong brownish black spots. It is of slender and elegant form, generally distributed over Europe, a permanent resident in Great Britain, and most abundant in meadows; it sings from the middle of April to the end of July, and rears 2 broods in a season; its notes are remarkably fine, uttered when perched, seated, or flying, in the latter case commencing at a considerable height, hovering a little while, and descending warbling to the ground. It is in the nest of this species that the cuckoo generally places its eggs to be hatched by parents not their own. The tree titlark (*A. arboreus*, Bechst.) is 6¼ inches long and 11¼ in alar extent, much like the last, but with thicker bill and shorter and more curved hind claw; it prefers wooded districts, and perches on trees much of the time, whence its name; the song is more mellow and modulated and longer continued than in the preceding species, the bird beginning it from the top of a bush or tree, rising like a skylark, but to a moderate height, then with outstretched wings and expanded tail making a half circle in its slow descent till it reaches a treetop again; it is migratory in England. The shore titlark (*A. obscurus*, Bechst.) is 6¾ inches long and 10¾ in alar extent; above dull olivaceous with obscure dusky streaks, and yellowish gray below. It is called also rock and sea lark. It frequents the sea shore, following the retreating tide, searching for small mollusks and crustaceans with the wading birds; its song is a shrill and not very agreeable warble, performed in the air; it is most abundant in S. Europe.

TITLES OF HONOR, designations by which persons are addressed in consequence of some office or dignity in their possession or inherent in them. The Greeks used them sparingly, and they were bestowed among the Romans chiefly upon men who had gained particular distinction in certain offices, in which case the designation became hereditary. Thus the honorary title of *Magnus* pertained to the descendants of Pompey, as those of *Africanus* and *Asiaticus* did to the Scipio *gens*. Other offices carried their titles with them, independent of the merits or services of the incumbent, and the words Cæsar, originally the name of a family, Augustus, and *pater patriæ*, were gradually applied indiscriminately to all who held the imperial throne. The title "illustrious," previously given only to those who had gained reputation in arms or letters, became in the reign of Constantine the Great hereditary in the families of princes, and thenceforth every son of a prince was illustrious. Toward the decline of the empire the emperors styled themselves divinities, and were addressed as "your perpetuity," "your eternity." The title most esteemed of all, however, and which preserved its significance the longest, was that of a Roman citizen. The titles assumed by European sovereigns, whether emperor, king, czar, or prince, are invariably accompanied by certain complimentary phrases of address, as "your majesty," your "royal highness," which are generally common to all of them. Previous to the accession of the Tudors the sovereigns of England were addressed as "your grace." Henry VIII. first assumed the title of highness, which was formerly given only to kings, and which is still the prerogative of people of royal birth; and at the field of the cloth of gold in 1520 he was first called "your majesty" by Francis I. of France. This title however had been previously assumed by Charles V. James I. was the first "sacred majesty" of England, and he added to his titles those of "most dread sovereign, his highness, the most high and mighty prince, James I.," &c. The present occupant of the British throne is called "Victoria, by the grace of God, of the United Kingdom of Great Britain and Ireland, &c., queen, defender of the faith." The compellation "sire" (father) seems to have been peculiar to the kings of France. Elsewhere in Europe the practice does not differ greatly from that of England in the phraseology of the terms applied to persons of the highest dignity, although in some countries, particularly Germany and Spain, the national taste has invented the most inflated titles for the sovereign. It is related that the emperor Charles V. having filled the first page of a letter to Francis I. with a list of his own titles, the latter prince in his reply styled himself simply king of France, citizen of Paris, and lord of Vauves and Gentilly. A similar anecdote is related of the banker Zamet, who, when asked by a notary by what title he wished to be designated in a legal document, replied: "Call me owner of 1,700,000 crowns." European potentates, however, are far surpassed in the number and magnificence of their titles of honor by those of other parts of the world. Thus the king of Ava in writing to a foreign sovereign calls himself "the king of kings, whom all others should obey; the cause of the preservation of all animals; the regulator of the seasons; the absolute master of the ebb and flow of the sea; brother to the sun; and king of the four and twenty umbrellas," the last named title having reference to the umbrellas carried before him as a mark of his dignity. Some royal titles, which would not be very reputable in European countries, are nevertheless highly valued in other parts of the world; and the king of Monomatapa in southern Africa is pleased to be addressed by his flatterers as "great magician" and "great thief." Certain Roman Catholic sovereigns prefix to the title of majesty common to all of them a qualifying epithet, commonly called a predicate, as "catholic" for Spain, "most faithful" for Portugal, and "apostolic" for Hungary. Under the old *régime* the king of France was called "his most Christian majesty."—The various orders of nobility in England are carefully distinguished by titles of honor, by which in legal proceedings and on certain public occasions the representatives of them are designated. The qualifying epithets by which such persons are addressed are also nicely graduated in accordance with the kind and degree of the dignity possessed by them, the baron being styled simply "right honorable," while a duke is addressed as "your grace," and the "most noble," and upon certain occasions as "most high, potent, and noble prince." In like manner the baron is addressed by the crown as "right trusty and well beloved," and the duke as "our right trusty and right entirely beloved cousin and councillor." The children of peers have also their titles of honor, such as honorable, lord, or lady, which however are not hereditary. The continental orders of nobility correspond generally with those of England, but the compellations of the persons possessing these dignities exhibit many minute and nice distinctions. The degrees of ecclesiastical rank are no less carefully distinguished. The pope is styled "his holiness," a cardinal "his eminence," an archbishop "his grace," and so on, down to the possessors of the inferior dignities, who both in Europe and America generally adopt the prefix of "reverend." In England the archbishops of Canterbury and York, beside the title of "grace," style themselves "by divine providence" and "by divine permission;" and the bishops are addressed as "lords" and as "right reverend." The degree in which the holders of civil offices are addressed by titles of honor varies considerably in different parts of Europe; and while in England comparatively few persons are so distinguished, the Germans regard the insignificance of the office as no obstacle to a recognition of the title pertaining to it. The tax-gatherer is not unfrequently addressed as "Mr. Tax-gatherer," and his wife as "Mrs. Tax-gatheress;" and the title of *Rath* or councillor has been so widely distributed through all the branches of the government, and often in such infelicitous connections, that its significance is greatly impaired. It may be observed that the title Mr., formerly a compellation of respect, is now the common prerogative of persons in Great Britain who have no hereditary or official title, and is universally so applied in the United States. An analogous practice prevails on the continent of Europe. In the state of Massachusetts the governor is entitled by law to be addressed as "his excellency," and the lieutenant-governor as "his honor;" and a similar privilege pertains to the same offices in a few other states of the American Union. All other officials have the sanction of custom or courtesy only for the titles of honor by which they are addressed. Judges are invariably addressed upon the bench as "your honor," and custom has given the same title to the mayors of cities and a few other officials. Judges, members of congress, and in some states the members of the upper house of the legislature, are frequently styled "honorable," although the practice is by no means universal; and the president of the United States receives the courtesy title of "his excellency." The clergy are universally addressed as "reverend," and those having episcopal functions adopt the prefix of "very" or "right." (See ESQUIRE.)

TITMOUSE, the popular name of the *parinæ*, a sub-family of the warblers, found in all parts of the world except South America. The bill is short, strong, rather conical and straight, with the tip entire; nostrils generally concealed by the frontal plumes; wings moderate and pointed, with the first 3 quills graduated; tail more or less long, rounded and even; tarsi long, slender, and scaled in front; inner toe shortest; claws strong and curved.—In the typical genus *parus* (Linn.) the bill is somewhat curved, not very stout; the head is not crested; the 4th and 5th quills are equal and longest; the crown and throat generally black. There are more than 50 species described in North America, Europe, Asia, and Africa, small, sprightly, and bold birds, and many of them with beautiful colors; they frequent woods and gardens, flitting from branch to branch, running rapidly up and down the limbs, and hanging in various attitudes from the twigs in searching for food, which consists of insects, larvæ, grains, and seeds; they will also eat flesh and carrion, and attack young and sickly birds, which they kill by strokes of the bill; they approach farm houses in severe weather, and in the spring sometimes do considerable damage in orchards by picking open the buds in search of insects. The nests are made in the forks of bushes and trees, of moss, grasses, and wool, lined with hair and feathers; many of the best known species deposit their eggs in holes of decayed trees, left by the woodpeckers or made by themselves; the eggs are 6 to 12; it is said that some of the foreign long-tailed species construct an oval nest with 2 opposite orifices for ingress and egress through which the tail projects; this is denied by Macgillivray. In warm climates they seem to prefer mountainous districts, some of the Indian species being found at an elevation of more than 7,000 feet; even in temperate zones many raise 2 broods in a year, laying many eggs, but fewer for the 2d brood; the young are fed chiefly on caterpillars, and hence these birds are among the farmer's best friends.—The largest of the well known American species is the tufted titmouse (*lophophanes bicolor*, Bonap.), 6½ inches long and about 10 in alar extent; the crown has a conspicuous crest, the bill is conical with the upper and lower outlines convex, wings graduated with the first quill very short, and the tail moderately long and rounded. The color above is ashy black; frontal band black; under parts uniform whitish, sides brownish chestnut; sides of head nearly white, and bill black. It is found throughout eastern North America to the Missouri, appearing in the middle states about May 1, in the summer inhabiting the forests, in flocks or families of 8 or 10, in company with the nuthatch and downy woodpecker; the flight is short, with jerks of the body and tail; the note is a kind of pleasing whistle; it is fond of nuts, which it holds in the claws, breaking the shell with the beak; like most others of the genus, it attacks smaller birds; the eggs are 6 or 8, white with a few red spots at the larger end, and are laid in holes of decayed trees.—In the genus *parus* (Linn.) belongs the black-capped titmouse or chickadee (*P. atricapillus*, Linn.), 5 inches long and 7¼ in extent of wings; the back is brownish ashy, top of head and throat black, sides of head white; below whitish tinged with brownish on the sides; outer tail feathers, some of the primaries, and secondaries margined with white; wings brown. It is found in eastern North America along the Atlantic border, according to Audubon rarely met with S. of Maryland and Kentucky; it is very common in the fur countries and as far N. as lat. 65°. It is hardy, restless, industrious, and frugal, breeding in the most retired parts of the forest, being at this time very shy, but familiarly approaching houses in winter; when the pathless woods are covered with snow and the cold is 20° below zero, this little bird cheers the woodcutter and the traveller with its musical "chick-a-dee-dee," grateful for any crumbs left from their dinner; it is truly omnivorous, and often attacks young birds; the nest is generally in a hole made by a woodpecker or by itself, not more than 10 feet from the ground, purse-shaped, and lined with soft hairs; the eggs are 6 to 8, ⅝ by ½ inch, white with light reddish dots and marks; 2 broods are raised in a year; the flight is short, with a murmuring sound. Species resembling this occur in the southern and western states, Mexico, and on the Pacific coast. The Hudson's bay titmouse (*P. Hudsonicus*, Forst.) is 5 inches long and 7 in alar extent; yellowish olive brown above, purest on head; chin and throat dark sooty brown; sides of head and lower parts white; sides of body and anal region light chestnut; no white on wings or tail, the last nearly even. It breeds from Labrador to Maine, rarely coming S. of the latter, and going further N. than any other species.—The largest of the European species is the great titmouse or tit (*P. major*, Linn.), called also ox-eye and black-cap in England, and *la charbonnière* in France; it is less than 6 inches long, with the head, fore part of neck, transverse band on sides, and longitudinal one on breast and abdomen, black; cheeks white, back yellowish green, and breast and sides yellow; wings and tail grayish. It is not a sociable bird; its usual note is a loud cheep followed by a harsh chatter, in the spring resembling the filing of a saw and heard to a great distance; it imitates the notes of other birds, and in its habits and food shows an alliance to the jays; in its search for flies it visits the cottage tops and pulls the straw from the thatch; it is found from Norway and Sweden to the southern boundaries of Europe. The blue tit (*P. cæruleus*, Linn.) is 4½ inches long and 7¼ in alar extent, with the upper part of the head light blue and encircled with white; band round neck, and before and behind eyes, duller blue; cheeks white, back light yellowish green, under parts pale grayish yellow, and middle of breast dull blue. This is the handsomest and most familiar species; in autumn it quits the woods and thickets and visits the gardens and orchards, incessantly hopping about among the branches, pert and irritable; it is called tomtit, blue-cap, blue-bonnet, and billy-biter in various parts of England. This bird, among others, has been frequently watched in Great Britain while rearing the young, and the parents have been found to carry to the nest on an average a grub every 2 minutes during the day, beside supplying their own wants. It is a permanent resident in Great Britain; it is very bold when sitting, hissing like a snake or angry kitten, and severely biting the hand brought near the nest. The crested tit (*P. cristatus*, Kaup) is a beautiful bird, having a crest on the crown like the American tufted species; it is 4½ inches long and 8 in alar extent, the feathers of the head black with white margins; upper parts gray tinged with yellowish brown; it is found in the pine and juniper regions of Europe.—The long-tailed tit (*mecistura caudata*, Leach) is about 6 inches long and 6¾ in extent of wings; the plumage is very soft, the bill black and much concealed by the feathers at the base, whence it is called mufflin; other names are bottle tomtit and poke pudding; head, throat, and breast white; broad band over eyes, nape, and back black; scapulars reddish; 3 lateral tail feathers on each side externally white, the rest black; the tail is twice as long as in any other European species, and the bill very short and convex; the nest is made on bushes and trees.—In the genus *paroides* (Koch) the bill is more slender and nearly straight; the species are found in the neighborhood of water, among the reeds on the borders of rivers, lakes, and marshes, the nest intertwined beyond the reach of the water; the food consists chiefly of insects and seeds; in the bearded tit (*P. biarmicus*, Koch) of Europe, 6 inches long, the head and neck are bluish gray, the upper parts, abdomen, and sides yellowish brown, and there is a tuft of pendent feathers between the bill and eyes; the gizzard is very muscular, unlike the true tits, on which account some have placed it among conirostral birds; mollusks like *succinea* and *pupa* are swallowed whole, but the shells are soon broken up by the stomach. The hanging tit (*P. pendulinus*, Koch), 4½ inches long, is reddish gray above, with wings and tail blackish, and lower parts rosy white; it is found in eastern and northern Europe, and constructs very artistically a nest woven of the fibres of bark and the cotton of the seeds of willows, fastened to a reed or thin branch and surrounded by closely tangled bushes, which protect it from the wind and hide it from view.—A species from Java (*psaltria exilis*, Temm.) is but a little over 3 inches long.

TITTMANN, JOHANN AUGUST, a German theologian, born at Langensalza, near Gotha, Aug. 1, 1773, died in Leipsic, Dec. 31, 1831. He studied theology and philosophy at the universities of Wittenberg (where his father was professor) and Leipsic. In 1796 he was appointed extraordinary professor of philosophy, and in 1800 extraordinary and in 1805 ordinary professor of theology at Leipsic. The latter position he retained until his death. He is the author of numerous theological works, of which the most important are a "Cyclopædia of Theological Science" (Leipsic, 1798), and a "History of Theology and Religion in the Protestant Church during the second half of the 18th Century" (Breslau, 1805). He also edited the symbolical books of the Lutheran church (*Libri Symbolici*, Leipsic, 1817) and the Greek New Testament (Leipsic, 1824). At the congress of Vienna he vainly advocated the reorganization of the *Corpus Evangelicorum*, a supreme tribunal for the Protestant churches of Germany.

TITUS, a N. E. co. of Texas, bounded N. by Sulphur fork of Red river, S. by Big Cypress bayou, and intersected by White Oak bayou; area, 1,100 sq. m.; pop. in 1860, 9,648, of whom 2,438 were slaves. The surface is generally level and the soil fertile. The productions in 1850 were 66,000 bushels of Indian corn, 8,088 of oats, 292 bales of cotton, and 39,175 lbs. of butter. There were 4 churches, and 50 pupils attending public schools. Capital, Mount Pleasant.

TITUS (TITUS FLAVIUS SABINUS VESPASIANUS), a Roman emperor, born Dec. 30, A. D. 40, died near Reate in the Sabine country, Sept. 13, 81. He was the son and successor of Vespasian, and was educated in the imperial household with Britannicus, the son of Claudius, who was poisoned by Nero; and it is said that the future emperor tasted some of the same deadly potion and became sick in consequence. While still young he served as military tribune in Britain and Germany, and subsequently became quæstor. During the Jewish war he had command of a legion under his father, captured the cities of Tarichæa, Gamala, and other places, and also fell in love with Berenice, the daughter of Herod Agrippa. By reconciling his father and Mucianus, the governor of Syria, he was of invaluable service in contributing to the elevation of the former to the throne. When Vespasian went to Rome, he left Titus to end the Jewish war, which he accomplished on Sept. 8, 70, by the capture of Jerusalem and the massacre and dispersion of its inhabitants. Subsequently he returned to Rome by the order of his father, and proved by his prompt obedience that the rumors which charged him with aiming at the throne were unfounded. In that city he had the honor of a triumph along with his father for their common success in the Jewish war, and during the remaining years of the reign of Vespasian was employed in discharging the highest functions of state. He drew up the imperial edicts, and was permitted to write letters in the emperor's name. At the same time it was feared that his elevation to power would destroy the natural goodness of his character, as he began to be fond of the pleasures of the table and of indulging his licentious passions. After the capture of Jerusalem, Berenice had followed him to Rome, and at one time it was said that Titus wished to make her his wife; but out of deference to the feelings of his subjects, she was finally sent away from the city. He ascended the throne in 79, and by his conduct soon dispelled the ill-founded impression that he would be another Nero. His reign was marked by a succession of terrible calamities, the injuries inflicted by which he made earnest efforts to repair. The towns of Herculaneum, Stabiæ, and Pompeii were destroyed in that eruption of Vesuvius in which the elder Pliny lost his life; in 80 a great fire broke out in Rome which lasted 3 days, and consumed a large number of houses and many public edifices, among which were the capitol, the library of Augustus, and the theatre of Pompey; and moreover a plague began to ravage the city, of which thousands died daily. Titus almost exhausted his finances in order to relieve his unfortunate subjects, repaired many aqueducts, made a road from Rome to Ariminum (the modern Rimini), completed the Colosseum, which his father had begun, and also constructed the baths called the baths of Titus. In dedicating these two last, he gave magnificent entertainments, which continued 100 days, on one of which 5,000 wild beasts were said to have been set fighting in the new amphitheatre. His reign was throughout marked by great clemency, checking all prosecutions of *læsa majestas*, and punishing all informers. He did not even inflict the punishment of death upon those who conspired against his life, and pardoned his brother Domitian, who several times had attempted to get rid of him in order that he himself might ascend the throne. In 80 and 81 Agricola completed the subjugation of Britain. Meanwhile the health of Titus declined, and going to the Sabine country, he expired in the same villa in which his father had died. There were suspicions that Domitian, who succeeded him, was instrumental in procuring his death. Beside the letters and edicts of his composition, Titus is said to have written Greek poems and tragedies. The chief authorities for his life are Suetonius, Dion Cassius, and Tacitus.

TITUS, a companion and fellow laborer of the apostle Paul. He was a Greek, but we know not from what country. He was one of those persons sent from Antioch to Jerusalem to consult the apostles, and it was not judged necessary that he should be circumcised. He accompanied the apostle on his journey to Jerusalem, was his agent at Corinth and in Dalmatia, and was left behind with ecclesiastical commissions upon the island of Crete. According to Eusebius, Jerome, Theodoret, and the ecclesiastical tradition in general, he was the first bishop of Crete.

TITUS, Epistle to, a canonical book of the New Testament, addressed by the apostle Paul to his disciple Titus. This and the two epistles to Timothy form the pastoral letters of the apostle, all of which have so many points in common that their authenticity has been generally attacked and defended simultaneously. (See Timothy, Epistles to.) The date of the Epistle to Titus has been the subject of much dispute, some fixing it as early as A. D. 52, others as late as 65, others at various intermediate years. The apostle furnishes Titus, whom he had left behind in Crete, with rules of conduct, especially in regard to the appointment of elders (i. 5–9), and warns him against certain false teachers (i., 10–16). He then describes the virtues becoming all classes, ages, and both sexes (ch. ii.), and inculcates obedience to civil rulers, moderation, gentleness, and avoidance of all idle speculations (ch. iii.).

TIVOLI (anc. *Tibur*), a town of central Italy, Papal States, situated on the left bank of the Teverone (anc. *Anio*), on the slope of Monte Ripoli, at an elevation of 850 feet above the sea, 18 m. E. N. E. from Rome; pop. 6,323. The streets are steep and narrow, and the houses generally indifferently built. It has a handsome cathedral and several churches. The place is very rich in remains of antiquity. The temple of the Tiburtine sibyl is a beautiful circular building surrounded with Corinthian columns, and adjoining it is the temple of Vesta, now used as a Christian church. There are also remains of baths, bridges, several villas, and of a vast palace commenced by Hadrian. The climate is not considered good, and a great amount of crime prevails among the inhabitants. The manufactures and trade are of little importance. The Teverone forms a series of cascades in the neighborhood of the town, which are a great source of attraction.—Tibur is said to have been founded by the Siculi long anterior to the building of Rome, and to have been afterward colonized by Theban Greeks before the Trojan war. It possessed a small territory, with Empulum, Sassula, and other towns. It is mentioned by Pliny as one of the Sabine towns. The Tiburtines and Romans were at enmity, and the former aided the Gauls in their invasion of Rome in 361 B. C. This brought on a war between them which lasted several years, until in 348 the Tiburtines submitted. A few years later they joined the Latin league against Rome, and after its overthrow united with the Prænestini and Veliterni; but in 335 the consul L. Furius Camillus put them to rout under the walls of Pedum, and Tibur was treated with great severity, but remained nominally independent and a place of asylum for Roman fugitives till the end of the republic. Here Syphax died and Zenobia passed her captivity. The temple of Hercules, for whose worship Tibur was famous, was, excepting that of Fortune at Præneste, the most remarkable in the neighborhood of Rome. Many Romans had magnificent villas here in the later period of the republic and under the empire.

TLASCALA, or Tlaxcala (Aztec, "land of bread"), a territory of Mexico, bounded W. by the state of Mexico, and on all other sides by that of Puebla; area, 1,918 sq. m.; pop. in 1857, 90,158. It received its name from its great fertility in maize.—Tlascala, the capital, is situated between two mountains on the Rio Papagallo, 10 m. N. from the city of Puebla, and 70 m. E. by S. from Mexico; pop. in 1850, 3,463. It has a cathedral, a state house, an old bishop's palace, and a few other buildings of good architecture, among which is the oldest Franciscan convent in Mexico. In the surrounding country remains of the old Mexican architecture and fortifications still exist.—The Tlascalans belonged to the same family as the Aztecs, and formed at the time of the invasion of Cortes a powerful little republic, in which something like the feudal system was established. Although its territorial limits amounted only to 10 leagues in length by 15 in breadth, it successfully resisted all efforts of surrounding tribes and even of the Mexican monarchy for its subjugation. In 1519 the Tlascalans at first resisted the march of Cortes, but, after having been defeated in several engagements, formed an alliance with him, and received from him a kind of independent existence under Spanish rule, the cacique being immediately subject to the governor of New Spain. The city is said to have numbered at the time of the invasion about 20,000 families, and Sept. 23, the day of Cortes's entrance, is still celebrated by the inhabitants as a day of jubilee. After the revolution Tlascala, being too small to form an independent state, was made a territory.

TLEMCEN, or Tremcen, a town in Algeria, province of Oran, situated on elevated ground 68 m. S. W. from Oran; pop. about 10,000. It is an ancient place, with narrow streets, and brick or stone houses seldom more than one story high. The citadel is a very large building, and there are many interesting remains of Roman origin. Iron, morocco leather, carpets, and woollen, linen, and cotton goods are manufactured. A considerable trade is carried on with Morocco and the desert. Tlemcen was once the capital of a kingdom and a place of importance; but the inhabitants having revolted in 1670, the dey of Algiers laid it in ruins. The French took possession of it in 1836, but, in consequence of a treaty between them and Abd el Kader, they evacuated it the following year. It was again taken by them in 1841.

TOAD, the common name of a well known family of anourous or tailless batrachians, the general character and anatomy of which have been described under Frog, and Amphibia. The *bufonidæ*, which comprise the common toads, have a well developed tongue, jaws rather sharp at the edge but without teeth, thick and heavy body, and skin more or less covered with glandular warts which secrete an acrid fluid; the hind legs are but little longer than the anterior, so that they cannot make the long leaps of the frogs. According to Agassiz, the toads should rank higher than the frogs, from their more terrestrial habits; the embryonic web, which still unites the fingers of the frog, disappears in the toad, and the cutaneous glands of the skin do not exist in frogs. Toads, like frogs, absorb moisture by the skin, which is cast at intervals, coming off in lateral halves which are swallowed by the animal at a gulp; the skin feels hard to the touch, and, according to Mr. Rainey ("Microscopic Journal," 1855), contains a layer of earthy matter under the dermis effervescing with acids, considered by him the analogue of what becomes a continuous hard dermal skeleton in the testudinata. Like frogs, they have also a large sac resembling a bladder, often found filled with pure water, in no way connected with the kidneys, but formed of the allantois, serving as a reservoir of water and aiding in respiration, its walls being highly vascular. The acrid fluid of the skin may be pressed out from two eminences like split beans just behind the head; it comes forth in a jet, and will make the eyes smart severely if it touch them. The hyoid bone being absent, the root of the tongue is attached anteriorly in the concavity formed by the branches of the lower jaw, the free extremity pointing backward when at rest; it is capable of protrusion in a reversed position so rapidly that the eye cannot follow it. From their ugly form and disgusting appearance they have always been despised and persecuted, though they are really not only inoffensive but of great service to man in destroying noxious insects and larvæ; they usually lie hid during the day, but come out at dusk in woods, fields, and gardens, in search of food, and are not unfrequently found in cellars and dark places about houses; their metamorphoses are of the same character as those described under Frog; they live out of the water except during the breeding season in March or April; during winter they remain torpid in holes and crevices, under stones, stumps, &c.; they lay a great number of eggs united into long strings, enclosed in a gelatinous substance, generally 2, which the male draws out with his hind feet. The species are less numerous than in the terrestrial and tree frogs; they are found in both hemispheres, but unequally distributed, being most abundant in America, and least so in Europe, which has not a single species peculiar to it, both the common toad and the natterjack occurring also in Africa and Asia; they are more abundant in Asia than in Africa, and only one is described in Australia; Duméril and Bibron recognize only 85 species of *bufonidæ*.—In the genus *bufo* (Laur.) the tongue is oblong, free posteriorly; anterior limbs 4-toed and free, the posterior 5-toed and semi-palmated; the tuberosity behind each eye, above the tympanum, porous and cushion-shaped; head obtuse in front, the upper jaw descending directly downward so that the intermaxillaries do not project in front of the cranium. The common European toad or paddock (*B. vulgaris*, Laur.), *le crapaud* of the French, is 3 to 3½ inches long, of a lurid brownish gray, with reddish brown tubercles and a blackish stripe externally or along the glands on the sides of the head; the iris red or golden; the body thick and much inflated. It feeds on insects and worms of all kinds, but will touch only a living and a moving prey; it remains motionless, with eyes fixed on its intended victim till it comes within reach of its tongue, which is darted out with extreme rapidity and accuracy; when it seizes a worm, it pushes it into the mouth with the fore feet till all disappears, and the animal is swallowed whole. Its motions are by a kind of crawl; when alarmed it stops and swells out the body, and sometimes makes short and awkward leaps. The eggs are in a double series, 3 or 4 feet long and ⅛ of an inch thick, and are laid in the spring 2 or 3 weeks later than those of the frog, the young being fully developed by the last of summer; they are smaller and blacker in all their stages than the young of the frog. Small toads of this and the common North American species are often found in places where they could not have gone through the usual stages of tadpole existence, as in gardens and cellars where they could neither have had access to water nor have been introduced from without; the gills must have disappeared shortly after birth, if they ever existed; they appear to have the power of prematurely assuming the functional conditions of terrestrial animals when circumstances demand it; a similar rapid metamorphosis is observed as a rule in the Surinam toad mentioned below. For details on this subject, see "Annals and Magazine of Natural History," vol. xi. (London, 1853). The toad has been regarded as venomous in almost all countries and ages, its saliva, bite, cutaneous and watery secretion, and even its breath and glance, being supposed to be poisonous and more or less maleficent; the acrid exudation from the skin is sufficient to produce a painful irritation on a tender skin or a wounded mucous membrane; though it will make a dog quickly drop a toad from its mouth, it has no effect when introduced into the circulation; it not only serves thus for the protection of the animal, but is probably partly excrementitious, and assists the lungs in freeing the blood of carbon. Space will not permit more than an allusion here to the strange stories and superstitions connected with the toad; venomous and malicious as it was believed to be by the ancients, "the precious jewel in its head" was considered its redeeming quality; this jewel was not its bright and beautiful eyes, as hinted at by Shakespeare, but the bufonite or toadstone, supposed to possess wonderful medical and magical powers, and now known to be a palatal tooth of the fossil ganoid fish *pycnodus*. It has always been made a favorite companion for sorcerers and witches, and an ever present article in their magic compounds; it was the first ingredient thrown into the witches' caldron in "Macbeth." The toad has been known to live 35 or 40 years, and it is thought to attain a considerably greater age; it has been so far domesticated as to come and feed from its master's hand, and seems capable of a real attachment to man. From their well known fondness for insects, toads make excellent traps for the entomologist, who may thus procure rare and otherwise unattainable beetles and nocturnal species, which they can be made to disgorge without difficulty; intelligent gardeners often put them into hot-houses to destroy ants and other insects and larvæ injurious to choice plants. Like many other reptiles, the toad can live a considerable time without food and with a very small supply of air; but the alleged instances of their having been found imbedded in solid stone or the heart of a tree, with no possible communication with the external world, have no doubt arisen from errors of observation; though much remains unexplained about the facts upon which this popular belief is based, and though toads have been taken from places where it seemed impossible that they could have obtained food, air, or moisture, it cannot be admitted that they have been hermetically sealed; with Mr. Thomas Bell it may be said: "To believe that a toad, enclosed within a mass of clay, or other similar substance, shall exist wholly without air or food for hundreds of years, and at length be liberated alive and capable of crawling, on the breaking up of the matrix now become a solid rock, is certainly a demand upon our credulity which few would be ready to answer." Dr. Buckland's experiments in 1825, in connection with the so called antediluvian toads, show that these animals cannot usually survive a long time, not even a year, deprived of air and food; see "Curiosities of Natural History," by his son Francis T. Buckland, 1st series, pp. 74–86 (London, 1859).—The other European species is the natterjack, mephitic, or green toad (*B. calamita*, Laur.); it is smaller, not 3 inches long, of a light yellowish brown color clouded with dull olive, and with a bright yellow stripe along the middle of the back; under parts yellowish with black spots, and the legs with black bands; iris yellowish green; it is less tumid and the eyes more prominent; the hind legs are shorter and the toes less palmated, indicating more terrestrial habits; it is less common, more active, and frequents drier places; it is found throughout Europe, and in Asia and N. Africa.—The common American toad (*B. Americanus*, Le Conte) is 2½ to 3 inches long, with short, thick, and bloated warty body; anterior limbs large, posterior short with a spade-like process at root of 1st toe, described as a rudimentary 6th toe by some writers; the jaws entire, and the eyes large and brilliant. It has a longitudinal line of dirty white from the occiput to the vent, on each side several spots of various colors, size, and shape, and a row of black and whitish ones extending to the hind legs; lower parts granulated and dirty yellowish white; anterior limbs dusky above with small white spots, the posterior ashy with blotches and bands of black. The head is smaller than in the European toad, the body less bloated, and the movements more active, yet they are representative species. In the breeding season toads and frogs do not generally assemble in the same pond; this species has been found on sandy shores overgrown with beach grass and in salt marshes; it is met with from Maine and Canada to the Mississippi valley; its note is a prolonged trill, continued by day and night, not unpleasant when the concert is at a considerable distance; it has been rendered so tame as to take flies from the hand. The Carolina toad (*B. lentiginosus*, Shaw) is 3 inches long, warty above, dusky brown with a tinge of yellow; below granulated, dirty yellowish white; head and mouth very large; it is timid and gentle, and fond of ants and fireflies; the males have a large gular sac, and are very noisy in the breeding season; it is found from S. Virginia to Florida, and along the gulf of Mexico. The marine toad of South America (*B. marinus*, Gray) is the largest of the family, 8 to 10 inches long without the legs; it is ashy gray, irregularly spotted with brownish, and with large warts.—There are several toad-like batrachians, generally arranged by modern herpetologists in the frog family, of which two may be mentioned here. The accoucheur toad (*B. obstetricans*, Laur.; genus *alytes*, Wagler) is common in the vicinity of Paris, in France, and in S. Germany; the males not only assist the females in the exclusion of the eggs (which are yellow), but afterward attach them to their hind legs by small pedicles; the young are developed under ground in the femoral region until they reach the tadpole state, when the males enter the water and the larvæ escape. In the genus *scaphiopus* (Holbrook) the body is short and thick, the head short, with teeth in the upper jaw and palate, and the tympanum distinct; posterior limbs short and stout, the leg shorter than the thigh, and a horny spade-like process in the place of a 6th toe; though generally ranked with the frog family, the form is toad-like; eyes large and prominent, with the iris golden and divided into 4 parts by 2 black lines; the anterior limbs long. The only species, *S. solitarius* (Holbr.), is between 2 and 3 inches long, olive and somewhat warty on the back, with 2 lines of pale yellow from the orbits to the vent; beneath yellowish white. It resembles the toads in its nocturnal, terrestrial, and subterranean habits, living in holes dug by itself, and seizing insects which fall in; its motions are sluggish, and it appears in the evening or after long continued rains; the males have a vocal sac under the throat; it is found from Massachusetts to Georgia. It is solitary except during the breeding season in early spring, when it takes to the water in considerable numbers; the eggs are laid from the last of April to the middle of July, are smaller and darker than in the common toad, and placed commonly around a spear of grass; as in the frogs and toads, they are frequently destroyed by a parasitic fungus. Swimming is performed by alternate strokes, as in the turtles, and their excavations are made by pushing out the hind feet laterally, by which they rapidly get under ground, the body being thrust backward as fast as the hole is formed; the pelvis is very loosely articulated to the sacrum, and moves freely backward and forward upon it.—The family *pipidæ* constitute the group of *phrynaglosses*, so named from having no tongue, as distinguished from the *phaneroglosses*, in which this organ exists; the tympanum is concealed, and its cavity communicates with the mouth by a single opening in the middle of the posterior part of the palate; the head is triangular, and the small eyes are low and near the mouth; the body is broad and thick, the hind legs very powerful and large, and the toes united by a complete and full web. The family contains only 2 genera, *pipa* (Laur.) and *dactylethra* (Cuv.), each with a single species. In *pipa* there are no teeth, and the last joint of the slender anterior toes is divided into 4 parts. In *dactylethra* the upper jaw has small pointed teeth, the tongue is at the back of the mouth, and some of the hind toes have (alone among batrachians) hoof-like claws; the anterior legs are small and slender; the *D. Capensis* (Cuv.) is found at the Cape of Good Hope and on the Mozambique coast. The Surinam toad (*P. Americana*, Laur.) has a remarkable and anomalous mode of reproduction; the eggs do not escape into the water, but are received by the male, who deposits them on the back of the female and there impregnates them (some authors say that impregnation takes place before the deposition of the eggs on the back of the female); the skin becomes thickened between them, rises and partly invests each egg in a sac or pouch, covered by a thin operculum of dried gelatinous matter, probably a portion of that which originally surrounded the egg; the young go through the usual changes in the dorsal pouches, and emerge perfect toads; the yolk is of large size; the external branchiæ disappear at a very early period; the tail is fully formed in the embryo, but is absorbed before it leaves the egg; the embryo at this stage is larger than the original egg, so that it must have absorbed something from the pouch of the parent. This animal is commonly found in the dark corners of houses in Guiana and Surinam, and, though exceedingly disgusting in appearance, is said to be eaten by the natives.

TOAD FISH, a spiny-rayed fish of the *lophius* family, and genus *batrachus* (Bloch.), so named from its large head, wide gape, usually naked skin, and disgusting appearance; it is also called frog fish and oyster fish. The head is flattened and wider than the body; teeth conical, small and crowded on the intermaxillaries, larger on the lower jaw, palate, and vomer; operculum small and spiny; head, lips, and cheeks provided with numerous fleshy appendages; lower jaw the longest; 1st dorsal short, with 3 spinous rays almost concealed in the skin; 2d dorsal and anal low, soft, and long; ventrals under the throat, narrow, with 3 rays; pectorals on short arms of 5 carpal bones; 4th branchial arch without gills; body generally scaleless; no pyloric cæca; air bladder deeply forked anteriorly, attached to the vertebræ by slender ligaments, and muscular on the sides. They hide in the sand and mud of salt water, and occur in both hemispheres, preying on fish. There are more than a dozen species, of which one of the best known is the grunting toad fish (*B. grunniens*, Bloch), found in the seas of the East Indies; the skin is naked, smooth, soft and spongy; the head and jaws with numerous cutaneous appendages; the color is brownish above, marbled with darker, below white, fins white with brown bands; it is 8 to 13 inches long, and is said to be eaten at Bombay; it received its specific name from its making a grunting noise like a pig, from the expulsion of air by the muscular air bladder through the mouth.—The common American toad fish (*B. tau*, De Kay) is much like the

East Indian, with half a dozen more rays in the 2d dorsal and anal, stronger teeth, more prominent dorsal spines, and rather darker colors; it is 8 inches to a foot long, of a light brown color, marbled with black, and the fins with black lines; the body is covered with a copious viscid secretion; the mouth very large, and the chin and cheeks with numerous fleshy appendages. It is found along the Atlantic coast from Maine to the gulf of Mexico and the West Indies, on the New England coast usually in ponds and lagoons connected with the sea, in muddy shoal water, or under eel grass and stones; it is sometimes taken in winter by the fishermen spearing eels through the ice; where it is abundant, as in some places along the New Jersey coast, it is a great pest from its taking the bait intended for more valuable fish; it lives a considerable time out of the water. It is fond of lurking in holes in the sand, watching for prey like a dog in a kennel, and snapping at any unwary fish coming within reach of its wide jaws; in the summer it may be seen guarding its eggs or young, the latter being found adhering to the under surface of stones by a disk at the end of the yolk sac, and afterward by the ventral fins. The disgusting appearance of this fish, its slimy body, goggle eyes, and immense mouth, have generally prevented the use of its flesh as food, though it is said to be delicate, palatable, and wholesome; it is a savage biter, and capable of inflicting severe wounds. The specific name, which was conferred by Linnæus, though he referred the fish to a wrong family, is derived from a character common to many other species, and only observable in dead and dried specimens; in these the bones of the upper surface of the skull present a transverse and longitudinal ridge united like the letter T (Gr. *tau*). Other species are found in the Indian and African seas, and some of larger size and with soft scales on the Brazilian coast.

TOBACCO, the common name of several species of plants of the genus *nicotiana*, natural order *solanaceæ*, and also of the dried leaves of the plants. The order is remarkable for the number of genera belonging to it of plants possessing powerful narcotic poisonous properties, and at the same time of useful edible plants. Of the former kind may be named the belladonna or deadly nightshade, the stramonium or thorn apple, the hyoscyamus or henbane, &c.; and of the latter the tomato and the potato, which last also affords the poisonous substance solanine. The name tobacco is supposed to be derived from the Indian *tabacos*, given by the Caribs to the pipe in which they smoked the plant. Others derive it from Tabasco, a province of Mexico; others from the island of Tobago, one of the Caribbees; and others from Tobasco in the gulf of Florida. The name of the genus is derived from that of the French ambassador to Portugal, Jean Nicot, who brought some tobacco in 1560 from Lisbon to France. Several species of the plant are recognized by botanists, but most of the tobacco of commerce is obtained from the *nicotiana tabacum*, the common Virginia or sweet-scented tobacco. The plant is an annual, growing 3 to 7 or 8 feet high, with an erect, round, hairy, viscid stem, and a large fibrous root. It bears numerous very large leaves of a pale green color, sessile, ovate lanceolate and pointed in form, which come out alternately from 2 to 3 inches apart. Those near the bottom are sometimes 2 feet long and 6 inches broad. The flowers grow in loose panicles at the extremities of the stalks, and the calyx is bell-shaped, and divided at its summit into 5 pointed segments. The tube of the corolla expands at the top into an oblong cup terminating in a 5-lobed, plaited, rose-colored border. The pistil consists of an oval germ, a slender style longer than the stamens, and a cleft stigma. The flowers are succeeded by capsules of 2 cells opening at the summit and containing numerous kidney-shaped seeds. The plant was unknown to the Europeans until the discovery of the American continent, when it was first noticed by sailors sent ashore by Columbus in Cuba. They found to their astonishment the natives puffing smoke from their mouths and noses, which they afterward learned was derived from the combustion of the dried leaves of this plant. The smoke was inhaled through a hollow cane, one end of which was introduced into the mouth, or in case of the cane being forked, the forked ends were inserted in the nostrils, and the other was applied to the burning leaves. As other portions of America were discovered, tobacco was very generally met with, and appears to have been used in various ways by all the tribes from the N. W. coast to Patagonia. Garcilasso speaks of the ancient Peruvians as using it only for medicinal purposes in the form of snuff. The Aztecs in Mexico, according to Bernal Diaz, used pipes of a varnished and richly gilt wood, and mingled with the intoxicating tobacco the liquidambar and various aromatic herbs. They are also spoken of by Sahagun in his "History of New Spain" as using the leaves rolled into cigars, which they ignited and smoked in tubes of tortoise shell or silver. The use of the pulverized dried leaf or snuff was noticed by Roman Pane, a friar who accompanied Columbus on his second voyage. The natives, he found, took it as a purgative medicine, snuffing it up through hollow canes. Thus all the modes in which the plant is now used appear to have been in common practice with the ancient American races. Its use is traced back to still more remote periods in the pipes found in the ancient mounds and other monuments of unknown races, that inhabited this continent before the Indian tribes. (See PIPE, TOBACCO.) The history and uses of the plant are further noticed in the article CIGAR.—Among the many species and varieties of the tobacco plant, several are worthy of special mention. The plant which yields the "large-leaved" or "Orinoco tobacco" is probably merely a variety of the *N. tabacum*, though it has been named by Miller *N. latissima*, and by Sprengel *N. macrophylla;* the large Havana cigars are supposed to be made of its leaves. The *N. rustica*, or "common green tobacco," is the species most cultivated in Europe and some parts of Asia and Africa, where also it grows wild, and is said to be that originally introduced into Europe from America. It furnishes the tobacco of Salonica, and the Turkish tobacco grown on the coasts of the Mediterranean, which is so highly valued in India. In England it is cultivated in gardens, and is used by gardeners to destroy insects. Its leaves are petiolate, ovate, and quite entire. The celebrated Shiraz or Persian tobacco is produced by the *N. Persica* (Lindl.). The small Havana cigars are said to be made of the leaves of *N. repanda* (Willd.). The *N. fruticosa* is supposed to be a native of China, and to have been cultivated there in ancient times. The *N. quadrivalvis* (Pursh) affords tobacco of excellent quality to the Indians of the Missouri and Cumberland rivers; the dried flowers are preferred to the leaves. The *N. nana* and the *N. multivalvis* are also plants of the extreme western territories. The calyx of the latter, which is very fetid, is preferred to any other part.—The varieties of tobacco known in commerce are designated by the names of the districts where they are produced. The principal varieties of the United States are the Virginia, Kentucky, Maryland, Missouri, and Ohio. The first is the strongest kind of tobacco, its leaves of a deep brown and tough, and is better adapted for chewing, for snuff, and for smoking in pipes, than for cigars. The other varieties are generally of a paler color, and of various degrees of strength. The tobacco raised in Connecticut and Massachusetts is alluded to in the article CIGAR, as used for the outer covering of cigars, and the same article names the varieties best adapted for these. The Levant tobaccos are mild and pleasant, and highly valued. The Turkish variety, of which the Latakia is most celebrated, is exported in broad and separate leaves of a bright yellow color. Manila tobacco, grown in Luzon, is dark-colored, and is largely used in the manufacture of cheroots, as cigars are termed in the East.—Of the analyses that have been made of tobacco, the following are the most important. The first by Vauquelin is given in the *Annales de chimie*, vol. lxxi. p. 139, and presents the following ingredients: an acrid volatile principle (nicotine); albumen; red matter, soluble in alcohol and water; acetic acid; supermalate of lime; chlorophyl; nitrate of potash and chloride of potassium; sal ammoniac; and water. The next is the analysis of the tobacco leaf by Dr. Conwell, of Philadelphia, given in the "American Journal of Science," vol. xvii. p. 369: gum; mucilage, soluble in both water and alcohol; tannin; gallic acid; chlorophyl; green pulverulent matter, soluble in boiling water; yellow oil having the odor, taste, and poisonous properties of tobacco; pale yellow resin (large quantity); nicotine; a substance analogous to morphia; an orange-red coloring matter; and nicotianine. The German chemists Posselt and Reinmann obtained the following results, quoted by Berzelius in his *Traité de chimie*, and by Gmelin in his *Handbuch der Chemie*, vol. ii. p. 1303:

Nicotine	0.060
Concrete volatile oil	0.010
Bitter extractive	2.870
Gum with malate of lime	1.740
Chlorophyl	0.267
Albumen and gluten	1.308
Malic acid	0.510
Lignine and a trace of starch	4.969
Salts (sulphate, nitrate, and malate of potash, chloride of potassium, phosphate and malate of lime, and malate of ammonia)	0.734
Silica	0.088
Water	88.280
Total	100.836

The active principles of the plant reside in the alkaloid nicotine or nicotia, and the nicotianine. The former was first separated in a pure state by Messrs. Henry and Boutron, that obtained by the other chemists being an aqueous solution of the alkaline principle in connection with ammonia. (See NICOTIA.) The strongest Virginia and Kentucky tobaccos contain from 6 to 7 per cent. of it, while some of the milder kinds used for cigars contain only about 2 per cent. Nicotianine is the concrete volatile oil of tobacco, or tobacco camphor, obtained by distillation. Six pounds of the leaves yield only about 11 grains of the oil. It is a fatty substance, having the smell of tobacco smoke and a bitter taste. It is volatilized by heat, and is insoluble in water and dilute acids, but dissolves in alcohol, ether, and solution of potash. An empyreumatic oil obtained when the distillation is conducted at a temperature above 212° contains nicotia, and is a most virulent poison. It is of a dark brown color, an acrid taste, and a smell like that of old tobacco pipes. This oil, which cannot be distinguished from that of foxglove, has been detected in tobacco smoke together with nicotianine, nicotia, salts of ammonia, and other volatile products. The ash of tobacco leaves amounts to about ⅙ to ⅕ of the entire weight, and consists chiefly of carbonates of lime and magnesia, chloride of potassium, and sulphate of potash.—The medicinal effects of tobacco upon the system are very marked, whether it is taken internally or applied externally. In small quantities, taken by either of the methods in which it is commonly used, as smoking, chewing, or snuffing the pulverized dry leaf, it acts as a sedative narcotic, calming mental and bodily restlessness, and producing a state of languor or repose most agreeable to those accustomed to its use. In larger quantities, or with those unaccustomed to it, it causes giddiness, faintness, nausea, vomiting, and purging, with great debility. As the nausea continues with severe retching, the skin becomes cold and clammy, the muscles relaxed, the pulse feeble, and fainting and sometimes convulsions ensue, terminating in death. Its power of causing relaxation of the muscular system is greater than that of digitalis, and has been taken advantage of in surgical treatment, as by Dr. Physick in a case of obstinate and long continued dislocation of the jaw, the desired effect being produced by smoking, to which the patient was unaccustomed. It is also applied in the form of infusions and cataplasms to relieve various spasmodic affections, and its use generally in medicine is in external applications, the nausea it occasions almost wholly preventing its exhibition internally. It is recommended in articular gout, rheumatism, and neuralgia; and the toothache is often relieved by smoking a cigar. In various cutaneous affections, as tinea capitis, psora, &c., it has proved highly beneficial. The application of the infusion, or even of the leaves, or of powdered tobacco, to surfaces deprived of the cuticle, is not without danger, and has sometimes been attended with fatal effects; these have even followed the inhalation of the smoke. The powerfully nauseating effects of tobacco suggest its use as an emetic; it is however rarely resorted to for this purpose, though in extreme cases, as of sudden poisoning, it might be found serviceable, where no other emetic is at hand. Entirely different opinions have been entertained by the most respectable medical authorities as to the effects of tobacco upon the system, whether beneficial or hurtful, as it is commonly used; and ever since the early introduction of tobacco many have earnestly condemned it for its supposed universally injurious qualities. Its use nevertheless has been constantly increasing, and multitudes among all nations depend upon it daily, suffering extremely if deprived of it for a time. Its universal distribution throughout almost all climates and countries, taken in connection with the strong passion soon acquired for its use, would seem to imply that the plant exercises some important influence upon the human system; still it is not apparent what benefit is conferred upon generations of recent times, which those were deprived of that were ignorant of its use. It does not appear to affect in any way the duration of human life, except occasionally when used to great excess. To some persons the use of tobacco is repugnant, and by such it is naturally condemned and avoided.—Tobacco is successfully cultivated throughout a wide range of latitude. Excellent varieties are produced in the equatorial regions, and in the United States its limits are not quite reached at the borders of Canada; in all the states it is cultivated to some extent. In England, as already mentioned, it is cultivated in gardens, and there is no question but it would be an important crop, if it were not for the severe restrictions imposed upon its growth for manufacturing purposes. It has been even raised in Scotland during the interruptions by foreign wars of the trade with the colonies. The plant requires a deep, rich, mellow soil or sandy loam, and thrives best on the south side of gentle slopes and places protected by woods or shrubbery. According to the best practice in the middle states, the seed, amounting to a gill for every 10 square yards, is mixed with about a quart of plaster or sifted ashes and sown regularly in well prepared beds. This may be done in the winter, but the best time is from the 10th to the 20th of March. The greatest care is taken to prevent the growth of weeds, and to root them out by hand while the plants are young. It is recommended, every week after the plants are up, to scatter over them broadcast a compost of ashes, plaster, soot, salt, and pulverized sulphur, with the view of invigorating them and preventing the ravages of the fly. In April, when the plants are of good size for transplanting, they are removed to other beds prepared with great care, and marked off by a small plough in furrows crossing each other at right angles, at distances of 2½ to 3 feet apart. In each of these the workman makes a hole with a finger of the right hand, and introduces the root of one of the plants. In 3 or 4 days the surface is lightly hoed, the weeds removed, and a little plaster and ashes is added to each plant; and in a week afterward a small plough is run twice through the rows. After this the "tobacco cultivator" or shovel is run through once in a week or 10 days to keep the ground open and free from weeds; and when the plants are too large for this process, the ground is once well hoed over and levelled. As soon as the blossoms are fairly formed, the tops are cut off down to the leaves that are 6 inches long, or still lower if the season is late. A number of the best plants should be reserved for seed, 100 being sufficient for a crop of 40,000 lbs. In two weeks after "topping" the plants are fit for cutting, though they may stand longer without injury. Until the leaves are cut and housed, the crop still requires great care to protect it from frost, to remove suckers that sprout from the base of each leaf, and to destroy worms which would otherwise devour the plants. The bottom or "ground leaves" are cut off and taken in before they become dry. The killing of the worms is a work of great labor, it being necessary to examine each plant, going over the whole field as far as practicable every morning and evening in order to break the eggs and kill such worms as may be found. A previous brood or "glut" of worms appears in the early part of the season, and to destroy these flocks of turkeys are let into the field, which devour the worms with great avidity, and kill many more than they can eat, seemingly enjoying the sport. When the leaves begin to turn yellow, the stalks are cut off close to the ground, where they are left for a short time to "fall" or wither before they are taken to the tobacco house. Here they are hung upon pegs or spears run through the stalks and left to dry. Sometimes the stalks are split with a knife from the top to within a few inches of the bottom before they are cut down for housing, when they are hung upon sticks which are suspended upon the joists of the tobacco house

12 or 15 inches apart. After the leaves have turned yellow, the drying is sometimes hastened by fires upon the floor of the house; but the process is better effected by the admission of plenty of air in dry weather in roomy houses provided with windows and doors, by the closing of which rain and dampness are excluded. When the tobacco is well dried and cured, the leaves are stripped from the stalk in mild damp weather, the leafstalks then becoming soft and pliant. The stripping, when systematically performed, employs several persons called "cullers" in succession. The first pulls off the defective bottom and worm-eaten leaves, and throws the plant to the next, who strips off all the bright leaves, and passes it to the third, who removes the rest, which are known as the "dull" leaves; and each as he accumulates leaves enough ties them in bundles of $\frac{1}{3}$ or $\frac{1}{6}$ of a pound in each, using one of the leaves as a wrapping for each bundle, and tucking the end in the middle of the bundle in order to confine it. The next operation is what is called "bulking" the tobacco, which is the final drying applied to each of the sorted kinds separately. The bundles are laid up in piles, generally between two logs laid parallel to each other and about 30 inches apart, the space between being filled with sticks to keep the bundles from the dampness of the ground. Upon these the bundles are smoothly laid with care crosswise, the buts outside and the tops lapping over each other in the middle. When raised to a convenient height, the bulk is covered with a few sticks to keep it in place. If found to heat from incipient fermentation, the bundles are to be taken down and laid again more loosely than before; and it may be necessary to hang them up in the house to become properly dried or "conditioned" for packing. When so dry that the bundles crack under pressure, advantage must be taken of the first damp weather, when the leaves become somewhat pliable, to pile them closely in larger and higher bulks under considerable pressure, in which condition they may safely remain for any time before packing in hogsheads. The legal dimensions of the tobacco hogshead in Maryland are 40 inches across the head and 52 inches deep, and the capacity is 800 lbs.; that of the hogshead of Virginia, Missouri, and Kentucky is 1,200 lbs., and of Ohio 750 lbs. The bundles are laid in uniformly in "courses" or layers, and are closely packed down by a man inside, who presses them with his knees and occasionally stamps upon them, with caution however not to break the bundles. Mechanical power is also applied at intervals, and continued several hours at a time, to compress the tobacco in the hogsheads. The filling of these completes the preparation of the leaf tobacco for the market. The production to the acre is usually from 600 to 700 lbs. According to the U. S. census returns for 1850, the product in Virginia averaged in that year 660 lbs; in Maryland, 650 lbs.; in Kentucky, 575 lbs.; in Ohio, 730 lbs.; in Tennessee, 750 lbs.; in Missouri, 775 lbs. The total number of acres in cultivation throughout the country was 400,000, which at an average of 600 lbs. to the acre would produce 240,000,000 lbs. The gross value of the product for that year was estimated at $13,982,686.—The tobacco packed in hogsheads is ready for transportation either to Europe or to the factories in the states in which it is converted into cigars, or into the forms of cut and roll tobacco for chewing and smoking in pipes, or into snuff. Of the European consumption of tobacco it is estimated that about $\frac{2}{3}$ are furnished by the United States; and of that consumed in France from $\frac{3}{4}$ to $\frac{4}{5}$ are from this country. This product is in request for chewing tobacco and snuff, while the milder sorts obtained from Cuba and from the interior countries of Europe are preferred for smoking. In many of the European countries the manufacture of tobacco is a very important business. In France the manufacture employs about 15,000 persons, who produce annually about 60,000,000 lbs. of manufactured articles of tobacco. The net profit realized by the state amounted in 1859 to 178,752,541 francs. In Holland the first class factories, of which the larger number are at Rotterdam and Amsterdam, are said to employ above a million of persons, the principal market for the products being in Germany. Large amounts are exported to Great Britain, notwithstanding the article is subject to a duty of 72 cts. per lb. and 5 per cent. additional, and there also gives employment to great numbers of operatives. Only 13 ports in England, 8 in Scotland, and 10 in Ireland are allowed to receive tobacco, and it must be brought by vessels of at least 120 tons. The casks as they are received are conveyed to the bonding warehouses, where every one is opened and its contents are examined. By taking out the head and loosening some of the staves, the whole hogshead is removed from the tobacco, and any injured portions are cut away by a powerful instrument, and the remainder is weighed and repacked. The duty is levied only on this portion, and the damaged is immediately consumed in a furnace on the premises. Taken to the factory, the bundles are dug out in masses with iron instruments, and being moistened with water (to which the French add $\frac{1}{18}$ its weight of sea salt, first dissolved in licorice juice in which a few figs have been boiled, together with bruised anise seeds, &c.), the bundles are easily separated from each other, and also the leaves. If the stalks have not been previously removed, this is now done by women or boys, who fold the leaf along the middle and strip out the midrib by a small instrument. The leaves may then be sorted according to their different qualities, the same plant affording leaves of different colors and flavors; and it is only by attention to this that certain manufacturers retain the reputation they have acquired for their peculiar products. To form

cut tobacco, the leaves are made up into large cakes, which are cut into shreds or filaments by the action of machines similar in principle to straw-cutters, and worked sometimes by horse power and sometimes by steam. The machines can be regulated to make finer or coarser filaments as desired. In this condition the tobacco is ready to be converted into the various forms for chewing or smoking purposes. The dark-colored leaves, made still darker by the liquoring process, produce the coarse variety called shag, and the better sorts are converted by spinning processes into cords variously folded or twisted, and distinguished by different names. The term "negro head" is applied to coarse rolls of this tobacco weighing 6 or 8 lbs. each. The variety known as "pigtail" is also a spun tobacco, the cord being but little larger than a pipe stem, and the leaves being flavored previous to spinning by the application of a certain sauce or sweet saline liquor, which gives to them a peculiar color and flavor. This variety is often covered with what are called robes, made of the largest and strongest leaves after the removal of the midrib. In the United States a great deal of tobacco, intended chiefly for home consumption, after being cut up, is made into flat cakes, which are moistened with molasses and powerfully compressed. These cakes are about 5 inches long and 1½ wide, and when closely packed in the strong oak boxes in which they are sent to market, they adhere together, forming a compact mass, from which the cakes are torn out only by the application of considerable force. This, known as plug or Cavendish tobacco, is in common use for chewing, and is smoked in pipes by those who are fond of tobacco of the strongest flavor.—The leaf stalks separated in the first manufacturing operation are preserved to be converted into snuff, and are used either alone or mixed with leaves. Some kinds of snuff are also made wholly from the leaves; and many varieties are formed from fanciful mixtures of tobaccos of different countries, with the addition of leaves of other plants, as of the rose, together with other ingredients, as rosewood dust, common salt, and various drugs. The tobacco is well dried previous to grinding, and this is sometimes carried so far as to give to the snuff the peculiar scorched flavor of the "high-dried" snuffs. The grinding is effected in mills of different sorts, one kind of which, much used for this and similar operations, is a form of the Chilian mill, described under that title; small mortars are also used, the pestles of which are kept rolling round by machinery. The subsequent sifting is also effected by machinery. Snuff is much more largely consumed in Great Britain than in the United States; but in the former country its use has considerably fallen off of late years, while that of cigars and of shag or cut tobacco is constantly increasing. The principal snuff factories are in London, Liverpool, Bristol, and Leeds in England; Glasgow and Edinburgh in Scotland; and Dublin and Cork in Ireland. The last produce the high-dried snuff, which is much esteemed in Ireland. In Scotland the rappee snuff is preferred, the so called Scotch snuff being used by women chiefly of the lower classes.—Next to the United States the principal tobacco-producing countries of the world are some of the West India islands and of the states of Central and South America, as Cuba, Hayti, Brazil, Peru, &c.; in the East Indies, Manila, Java, China, &c. Asia Minor, Egypt, Turkey, Greece, Hungary, the southern part of Russia, Holland, Belgium, all the states of Germany, many of the departments of France, Algeria, Corsica, and upper Savoy, are all somewhat noted for the culture of the plant. The total production of the world has been estimated as follows: Asia, 399,900,000 lbs.; Europe, 281,844,500; America, 248,280,500; Africa, 24,300,000; Australia, 714,000; making in all 995,039,000 lbs. The product and importations from the United States of some of the European countries are presented in the following table:

Countries.		Home product, lbs.	Importations from United States, lbs.
Austria	Hungary	68,000,000	2,945,000
	Galicia, the Tyrol, and Venice	11,000,000	....
Zollverein		55,000,000	7,200,000
Belgium		1,800,000	4,010,000
Holland		5,000,000	17,124,000
Bremen		....	38,058,000
Hamburg		....	2,000,000
Russia		25,000,000	....
Great Britain		....	24,208,000
France		....	44,000,000
Spain		....	7,524,000
Sardinia		....	3,811,000
Sweden and Norway		....	1,718,000
Portugal		....	836,000
Russia		8,180,000	....

The French manufacturers give the following characters to the tobaccos they employ: the Virginian, strong, very aromatic, and much esteemed for snuff; the Kentucky, strong, large-leaved, very choice; the Maryland, light, odoriferous, large-leaved, used exclusively for smoking in pipes; the Havana, unequalled for cigars; the Java, used for the same purpose, its odor like that of pepper; other tobaccos from the West Indies and Central and South America, used for cheap cigars. The tobaccos from the Levant are little esteemed. The Holland product has much strength, and is excellent for snuff mixed with weaker sorts. The Hungarian varieties are used for cigars and smoking tobaccos. Some of the French departments produce tobacco used exclusively for cigars, and other varieties used only for pipes. Some of the Algerian tobacco raised by the Arabs is equal to any obtained in America, but a large portion of the product from that country is of inferior quality.—**Tobacco Trade.** Tobacco, being an article of very general consumption, and yet not a necessity, has been selected by many of the European governments as a peculiarly appropriate commodity on which to raise a revenue. Some of these governments, as France, Spain, Portugal, Sardinia, and Austria, make it a monopoly, either wholly managing its manufacture and sale, or allowing individuals to import and sell under heavy imposts and restrictions. In England the customs duty on all raw tobacco is 3s. (72 cts.) per lb. and 5 per cent. extra, making 3s. 1⅗d. or 75 cts. On snuff the duty is 6s. 3¼d. per lb., and on cigars and manufactured tobacco 9s. 4½d. Notwithstanding this enormous tax, which on the raw tobacco amounts to 3 to 7 times the original cost of the article, the consumption is so great, that in the years 1857, 1858, and 1859 the revenue derived from this source amounted respectively to £5,258,431, £5,454,214, and £5,573,463; and the whole amount consumed in that country has been given at 29,737,561 lbs. per annum. The chief portion of the consumption is of shag or common roll tobacco, and the common kinds of snuff. In one of the principal London factories the daily production of cigars is only about 60 lbs., while that of cut tobacco is 2,000 lbs. The high cost of tobacco has led in England to extensive adulterations with a great variety of other leaves and other substances, the presence of which can generally be detected by the microscope. The following are among the articles most used: leaves of the rhubarb, dock, burdock, coltsfoot, beech, plantain, oak, and elm; peat earth, bran, saw dust, malt rootlets, meal of barley, oats, beans and peas, potato starch, and chicory leaves steeped in tar oil. The possession of any of these or of various other specified substances by a tobacco manufacturer renders him liable to a fine of £200. A work on "Tobacco and its Adulterations" was published in London in 1858, prepared by Henry P. Prescott, of the inland revenue department. The subject is also treated by Dr. Hassall in his "Adulterations Detected."—The production of tobacco in the several states and territories for the years named is given as follows in the census returns:

States and territories.	1840.—lbs.	1850.—lbs.	1860.—lbs.
Maine	30	....	....
New Hampshire	115	50	21,000
Vermont	585	....	12,000
Massachusetts	64,955	138,246	3,233,000
Rhode Island	317	....	1,000
Connecticut	471,657	1,267,624	6,000,000
New York	744	83,189	5,764,000
New Jersey	1,922	310	149,000
Pennsylvania	325,018	912,651	3,182,000
Delaware	272	....	10,000
Maryland	24,816,012	21,407,497	38,411,000
District of Columbia	55,550	7,800	....
Virginia	75,347,106	56,803,227	123,968,000
North Carolina	16,772,359	11,984,786	32,853,000
South Carolina	51,519	74,285	104,000
Georgia	162,894	423,924	919,000
Florida	75,274	998,614	758,000
Alabama	273,302	164,990	221,000
Mississippi	83,471	49,960	128,000
Louisiana	119,824	26,878	41,000
Texas	....	66,897	98,000
Arkansas	148,439	218,936	1,000,000
Tennessee	29,550,432	20,148,932	38,931,000
Kentucky	53,436,909	55,501,196	108,102,000
Ohio	5,942,275	10,454,449	25,529,000
Michigan	1,602	1,245	121,000
Indiana	1,820,306	1,044,620	4,658,000
Illinois	564,326	841,394	7,014,000
Wisconsin	115	1,268	87,000
Minnesota	....	....	33,000
Iowa	8,076	6,041	313,000
Missouri	9,067,913	17,113,784	26,485,000
Kansas	....	....	17,000
California	....	1,000	3,000
Oregon	....	325	....
Utah	....	8,467	....
New Mexico	....	70	....
Total	219,163,319	199,752,655	428,121,000

The annual export from the United States has been as follows for the years named:

Years.	Bales.	Cases.	Hhds.	Value.
1855	12,913	13,866	150,213	$14,712,468
1856	17,772	9,884	116,962	12,221,843
1857	14,432	5,681	156,848	29,662,772
1858	12,640	4,841	127,670	17,009,767
1859	19,651	7,188	198,840	21,074,038
1860	17,817	15,085	167,274	15,906,547
Total	95,225	55,445	917,807	$110,587.435

The importations of tobacco into the United States are chiefly from Cuba, and ⅘ of these are of cigars, the value of which is from $3,000,000 to $4,000,000 annually.—Among the publications upon tobacco, beside that of Prescott already referred to, may be named the treatise by Joubert, *Nouveau manuel du fabricant de tabac* (Paris, 1844); "The Uses and Abuses of Tobacco," by John Lizars, professor of surgery (Edinburgh; reprinted, Philadelphia, 1859); and "Tobacco, its History and Associations," by F. W. Fairholt (London, 1859).

TOBACCO PIPE. See PIPE.

TOBAGO, an island of the Windward group of the British West Indies, the N. point of which is in lat. 11° 25′ N., long. 60° 32′ W., 32 m. long by 12 broad; area, 97 sq. m.; pop. 13,027. Scarborough, on the S. W. side of the island, is the chief town. There are several good harbors on the N. side for vessels of about 150 tons, and a few also on the opposite side of the island. Tobago is a mass of rocks which rises abruptly on the N. E. side and descends toward the S. W., the most elevated part of which is about 900 feet above the sea. There are several small valleys, well watered by numerous streams. The productions consist of sugar, molasses, and rum. Tobago is not subject to hurricanes. It has a lieutenant-governor and local legislature. It was discovered by Columbus in 1496, and was ceded by France to Great Britain in 1763.

TOBIT, a book of the Old Testament in the Roman Catholic canon, but regarded as apocryphal by Jews and Protestants. It contains the history of a pious Jew of the tribe of Naphtali, living in exile at Nineveh. Being purveyor to the court of King Shalmaneser, he became wealthy; but under Sennacherib he lost his position and his property, because he had buried Jews who had been executed. Having returned to Nineveh after the death of Sennacherib, he became blind; but he was cured by a fish which his son Tobias had brought home from a journey undertaken in company with the angel

Raphael. The Greek text and the Latin translation of Jerome, which was made from a Chaldaic text, considerably differ. The author is supposed to have been a Jew of Palestine, but his age cannot be ascertained. Among the best commentaries on the book are those of Fritzsche (Leipsic, 1853), Sengelmann (Hamburg, 1859), and Reusch (Freiburg, 1857).

TOBOLSK, a government of Western Siberia, bounded N. by the Arctic ocean, E. by Yeniseisk and Tomsk, S. by the Kirgheez territory, and W. by Archangel, Perm, and Orenburg; area, 557,516 sq. m.; pop. in 1356, 1,017,633. The sea coast is indented by several deep bays, and for about 250 m. inland the country is barren and sterile. To the W. Tobolsk is separated from Archangel by the Ural mountains. In the centre of the government there are forests of great extent containing much fine timber, while toward the S. the land affords good natural pasturage and is well suited for cultivation, but is interspersed with sterile steppes. The greater part of the government is drained by the Obi and its tributaries, the Irtish, Ishim, Tobol, and others. There are many extensive lakes, in which, as well as the rivers, fish are very abundant. Different kinds of wild animals are numerous, more particularly those yielding valuable furs, and a large portion of the population are employed in hunting. The inhabitants are a mixture of Ostiaks, Samoyedes, Tunguses, and Russians, many of the last named being exiles, or descended from exiles. The mineral resources of the province have been but partially developed. Metals, glass, soap, and potash are manufactured. A large transit trade is carried on between the countries lying to the W., China, Bokhara, and Tartary. The principal towns, beside the capital, are Obdorsk, near the mouth of the Obi, Petropavlovsk, on the Ishim, and Omsk, on the Irtish, formerly the capital of a government of the same name.—Tobolsk, the capital, is situated on the right bank of the Irtish, at the confluence of the Tobol, in lat. 58° 12′ N., long. 68° 20′ E.; pop. about 20,000. Silk ribbons, reindeer and other skin dresses, soap, candles, and glass are manufactured; and the traffic between European Russia and China finds a centre here. Traders from Europe arrive with their goods in the spring, and in autumn their returning boats reach Tobolsk on their way to the W.; merchants from Tartary and Bokhara arrive about November and return home in spring.

TOCANTINS, a river of Brazil, formed by the Almas and Maranhão, which rise in the province of Goyaz and unite in lat. 14° S., long. 49° 15′ W. After a course of about 1,000 m., in a general northerly direction, it falls into the estuary of Para, about 80 m. S. W. from Para. The Araguay, which joins it about lat. 6° S., is the most important tributary; and although it loses its name, it has a longer course to the junction and a greater volume of water than the Tocantins. The affluents next in importance are the Paraman, the Manoel Alves Solobre, the Great Somno, and the Manoel Alves Septentrional, which join it from the E., and the Tucahunas and Teresa, from the W. The tide ascends about 300 m., and at its mouth the Tocantins is 8 m. wide.

TOCQUEVILLE, Alexis Charles Henri Clérel de, a French publicist and statesman, born in Paris, July 29, 1805, died at Cannes, April 15, 1859. After being admitted to the bar at Paris, he was appointed a judge in Versailles in 1826, and was promoted in 1830. The next year he was sent, in conjunction with Gustave de Beaumont, on a mission to the United States, to examine the penitentiary system; and a full report of their observations was published under the title *Du système pénitentiaire aux États-Unis* (8vo., 1832; translated into English by Francis Lieber, 8vo., Philadelphia, 1833). De Tocqueville had made use of the opportunity to acquaint himself thoroughly with the political and social institutions of the country, and wrote a philosophical work entitled *De la démocratie aux États-Unis* (2 vols. 8vo., Paris, 1835), which was extensively read, and rewarded in 1836 by a prize by the French institute, and in 1837 by his nomination to the academy of moral and political sciences, and in 1841 to the French academy. Being elected in 1839 to the chamber of deputies, he sat there among the most moderate members of the opposition, was in 1840 the reporter of a committee upon slavery, advocated the establishment in France of the American penitentiary system, and, while always ready to join in the improvements proposed by the ministry, was energetic in his denunciations against electoral corruption. He was one of those who foreboded the revolution of February. A member of the constituent assembly, he strongly opposed socialistic doctrines, and voted with the majority against ultra-democratic measures. He was appointed by Gen. Cavaignac to represent France in the diplomatic conferences held in Brussels upon the Italian affairs. On June 3, 1849, he became minister of foreign affairs, and strongly supported the French expedition to Rome, but, dissatisfied with the policy of President Louis Bonaparte, resigned his office before the end of the year, and sat again among the opposition. On Dec. 2, 1851, he was one of the deputies who met in the hall of the 10th arrondissement, and was arrested and incarcerated, but released in a few days. He now retired to private life, resumed his historical pursuits, and in 1856 published *L'ancien régime et la révolution* (8vo.; translated into English by J. Bonner, 12mo., New York, 1856). His *Œuvres et correspondance inédites* have been published, with a biographical notice by his friend G. de Beaumont (2 vols. 8vo., 1860; English translation, 2 vols. 8vo., London and Boston, 1861). His "Democracy in America" was translated into English by Henry Reeve, with a preface and notes by John C. Spencer (8vo., 1838), and abridged by the latter under the title of "American Institutions and their Influence," with notes (16mo., New York, 1856).

TOD, James, an English soldier and author, born in 1782, died in London, Nov. 17, 1835. He went to India in 1800 as a cadet in the East India company's service, and after the close of the Mahratta war was for many years employed in a survey of Rajpootana, of which country he finished in 1815 a magnificent topographical map. The result of his labors appeared in his "Annals of Rajast'han" (2 vols. 4to., London, 1829-'32), containing an elaborate account of the geography, history, and antiquities of the country. Between 1817 and 1823 he held the position of political agent of Mewar and several other Rajpoot states. Subsequent to his return to England in 1823, he was chiefly occupied with literary pursuits, the most important of which, in addition to the work above mentioned, was the preparation of his "Travels in Western India," published posthumously (4to., London, 1839). At the time of his death he held the rank of lieutenant-colonel.

TODD. I. A S. W. co. of Ky., bordering on Tenn., and drained by Pond river and several large creeks; area, 350 sq. m.; pop. in 1860, 11,575, of whom 4,849 were slaves. The surface is generally hilly and the soil fertile. The productions in 1850 were 803,941 bushels of Indian corn, 203,027 of oats, and 3,739,685 lbs. of tobacco. There were 21 churches, and 409 pupils attending public schools. It is intersected by the Nashville and Kentucky railroad. Capital, Elkton. II. A central co. of Minn., bounded E. by the Mississippi, and N. by Crow Wing and Red Eye rivers; area, 1,464 sq. m.; pop. in 1860, 430. The surface is generally level, interspersed with numerous small lakes, and the soil is productive. Fort Ripley is in this county.

TODD, Eli, M.D., an American physician, born in New Haven, Conn., about 1769, died in Hartford, Nov. 17, 1833. He was graduated at Yale college in 1787, studied medicine in New Haven, and commenced practice in Farmington, where he resided for nearly 30 years. In 1819 he removed to Hartford, and took an active and leading part in founding the insane retreat, one of the earliest hospitals for the insane exclusively, and the fifth hospital in which the insane were treated, in the United States; he presided over this institution till his death. Dr. Todd was the author of several professional monographs and some occasional addresses.

TODD, Henry John, an English clergyman and author, born in 1763, died at Settrington, Yorkshire, Dec. 24, 1845. He was educated at Oxford, and was successively a minor canon of Canterbury cathedral, vicar of Milton near Canterbury, rector of Allhallows, London, keeper of the manuscripts at Lambeth palace (1803), rector of Settrington (1820), prebendary of York (1830), and archdeacon of Cleveland (1832). His publications comprise editions of the poetical works of Milton and Spenser, with notes and memoirs; "Illustrations of the Lives and Writings of Geoffrey Chaucer and John Gower" (8vo., 1810); an edition of Johnson's "Dictionary," with corrections and additions (4 vols. 4to., 1814); "A Letter to the Archbishop of Canterbury, concerning the Authorship of Icôn Basilikè" (8vo., 1825), which assigns the work to Bishop Gauden; and a life of Archbishop Cranmer (2 vols. 8vo., 1831), growing out of a controversy with Dr. Lingard and others.

TODD, John, D.D., an American clergyman and author, born in Rutland, Vt., Oct. 9, 1800. He was graduated at Yale college in 1822, spent 4 years at the Andover theological seminary, and was ordained to the ministry in the Congregational church at Groton in 1827. In 1833 he was settled over the Edwards church at Northampton, in 1836 was called to the pastorate of the first Congregational church in Philadelphia, and in 1842 became pastor of the first Congregational church in Pittsfield, Mass., which position he still retains. Dr. Todd was one of the founders of the Mount Holyoke female seminary, and has been for 10 years the president of the board of trustees of the young ladies' institute at Pittsfield. In 1845 he received the honorary degree of D.D. from Williams college. Few works by American authors have had so wide a circulation as some of those written by Dr. Todd. He has published "Lectures to Children" (2 vols. 16mo., Northampton), which has been translated into French, German, Greek, Dutch, and Tamil, and several times reprinted in Great Britain; "The Student's Manual" (12mo., Northampton), of which 150,000 copies had been sold in England in 1855, and two translations had been made in France; "The Sabbath School Teacher" (12mo.); "The Lost Sister of Wyoming" (18mo.); "The Bible Companion" (18mo.); "Great Cities, their Moral Influence," &c. (18mo.); "The Young Man" (16mo.); "Simple Sketches" (2 vols. 16mo.); "The Daughter at School" (12mo.); "Summer Gleanings" (12mo.); "Truth made Simple" (18mo.); "Stories on the Shorter Catechism" (2 vols. 16mo.); "The Angel of the Iceberg," &c. (16mo.); "Index Rerum" (4to.); "Question Books on the Life of Adam and Moses" (2 vols. 18mo.); and a great number of sermons, orations, and occasional pamphlets.

TODD, Robert Bentley, a British physician and physiologist, born in Ireland about the commencement of the present century. He received his education in Ireland, settled in London, and upon the opening of King's college there was appointed professor of physiology and physician of the hospital connected with its medical department, the latter of which offices he still holds. He has considerable reputation as a practitioner, but is best known as the author or editor of a number of important medical works, including the "Cyclopædia of Anatomy and Physiology" (4 vols. 8vo., with supplement), published in conjunction with Dr. Grant; the "Physiological Anatomy and Physiology of Man" (2 vols. 8vo.), in conjunction with Dr. Bowman; "Anatomy of the Brain, Spinal Cord," &c.; "Lectures on Paralysis and Brain Diseases;" and "Treatise on Gout and Rheumatism." His contributions to medical journals, and papers in the "Medico-Chirurgical Transactions," are numerous.

TODDY TREE. See Palm, vol. xii. p. 703.

TODLEBEN, Francois Edward, a Russian general of engineers, born in Mitau, Courland, May 8, 1818. At 14 years of age he entered the engineering school of St. Petersburg, and subsequently was commissioned a lieutenant in the grenadier corps of sappers. For a number of years he was employed by the bureau of engineering in theoretical studies connected with the attack and defence of fortified places, and between 1848 and 1851 he served in the Caucasus against Shamyl. In the latter year he was appointed aide-de-camp to Gen. Von Schilder, a distinguished officer of artillery, and as lieutenant-colonel of the engineers of the guard he participated in the campaign against the Turks on the Danube in 1853-'4. In Aug. 1854, Prince Gortchakoff despatched him, as the best engineer officer under his command, to assist in the defence of Sebastopol, then threatened by the allied French and English forces. He was not intrusted with any important operations until the landing of the allies in the latter part of September; but from that time until the capture of the southern part of the city, in Sept. 1855, he exhibited engineering genius of the first order in the construction of earthworks which baffled every effort of the besiegers. He was severely wounded in the course of the siege, and in the latter part of 1855 was recalled to St. Petersburg, with the rank of aide-de-camp general, for the purpose of strengthening the defensive works at Nikolaiev and Cronstadt. He subsequently received the cross of St. George and other distinctions. He has not been in active service since the close of the Crimean campaign, nor has he fully recovered of his wound.

TODOS SANTOS (All Saints), a small town in a valley of the same name in the southern portion of the peninsula of Lower California, situated on the Todos Santos river, founded in the beginning of the 18th century by the Jesuits. The principal edifices belong to the mission, and consist of a church with a dome 125 feet high, and a convent and several buildings attached, which are surrounded by a wall 100 feet high and 15 feet thick. The foundations of the wall and of the church are of chiselled stone, but the remaining buildings are of adobes. Jesuit missionaries were sent to this place early in the 18th century from the college in Mexico, with full powers to colonize the peninsula. The mission after the expulsion of the Jesuits came into the hands of the Franciscans, by whom it is still controlled. The valley of Todos Santos is one of the most beautiful and fruitful in America. Cotton, rice, and sugar cane are abundant, coffee and cacao are cultivated, and the region also abounds in tropical fruits.

TODY, a diurnal, fissirostral bird of the roller family, sub-family *todinæ*, and genus *todus* (Linn.). In this genus, which is peculiar to tropical America, the bill is elongated, very broad and flat, almost like 2 thin plates, the upper mandible usually obtuse at the end, the gape opening as far as the eyes, and the base surrounded by large bristles; nostrils near the base; wings short and rounded, the first 2 quills short and narrow, and the 4th the longest; tail short and rounded; tarsi moderately long and slender, and covered in front by a single scale; outer toe longer than inner, and both united to the middle by membrane; hind toe short, and claws small; margins of the bill finely serrated. They are robust little birds, resembling the kingfishers in form, but having longer tarsi and tail, and a very different bill; they feed chiefly on insects, captured on the trees or on the wing as by the flycatchers; they eat also worms and small reptiles, which they seek upon the ground; their plumage is gaudy, and their flight rapid. The nest is made upon the ground, in a hole dug for the purpose lined with grass and straw, and the eggs are 2 to 4; Prince Neuwied says they make a conical, bag-shaped nest, of wool, with a narrow entrance on the side. The green tody (*T. viridis*, Linn.), very common in some of the West Indian islands, is about the size of a wren, bright grass green above, with the neck and throat red, breast whitish, and abdomen yellowish; it is usually seen singly, and is so stupid or fearless as often to be caught by the hand; it is bold and familiar, and apparently has no fear of man, in captivity seeking its food about an occupied room; it occasionally utters a low hissing note; when at rest it draws the head back, with the bill directed upward and the loose plumage puffed out, giving it a very stupid look; the nest is made in holes in banks dug to a depth of 6 to 12 inches.—These birds are represented in India and its archipelago by the allied family *eurylaiminæ*, which differ principally in having only the outer toe united to the middle by a web. These are of small size and beautiful colors, living in retired places, in marshy districts, and along the margins of lakes and rivers; they are usually seen in small flocks, feeding on insects, worms, and vegetable substances. The nest is made of small twigs, suspended from branches of trees, usually overhanging the water; the eggs are two.

TOFANA. See Aqua Tofana.

TOGA, the principal outer garment worn by the Romans. It differed in fashion somewhat at various periods, but had always a general semicircular form. One corner of the garment was placed upon the left shoulder, the remainder passed behind the body, over the right shoulder, and across the breast, the end being thrown back over the left shoulder. Behind the wearer, the garment reached very nearly to the feet. Togas were commonly made of wool. The toga worn by men, *toga virilis*, was entirely white; the *toga prætexta*, worn by various officers in the state, and by children of both sexes, had a broad purple border. The toga is supposed to have been received from the Etruscans. Originally it was worn by both sexes, but upon the introduction of the *stola* that garment was assigned to the Roman women, and the toga became the peculiar distinction of Roman men. Its use was forbidden to exiles and foreigners. In war it was laid aside, and it was chiefly worn in Rome; hence *togatus* is opposed to *miles* and to *rusticus*.

TOISE, an old French measure of length, which contains 6 French feet, or 1.949040 metres. It is equivalent to 6.3945925 English feet.

TOKAT, or Tocat, a town of Asiatic Turkey, in the pashalic of Sivas, situated on the Yeshil-Irmak (the ancient Iris), in lat. 40° 7′ N., long. 36° 30′ E.; pop. 100,000. It has high limestone hills on 3 sides, and is commanded by 2 peaks which are almost perpendicular and consist of crystalline marble. The town has a mean appearance, the houses being built of mud or unburned bricks. The manufactures consist chiefly of copper articles and hardware, woollen, linen, silk, cotton goods, and carpets; and there are dyeing and calico printing establishments. A considerable trade is carried on in supplying the surrounding country with manufactured goods, as well as by caravans with all parts of Asia Minor; but the commercial importance of Tokat is not so great as in former times. The inhabitants are chiefly Turks, but there are a large number of Armenians and a few Greeks.

TOKAY, or Tokaj, a town of Hungary, in the county of Zemplén, situated at the junction of the rivers Bodrog and Theiss, in lat. 48° 7′ N., 114 m. E. N. E. from Pesth, and 25 m. S. S. W. from Sátoralja-Ujhely; pop. 5,712. The Theiss is crossed by a large wooden bridge, and the town contains several churches. Some trade is carried on, and several important fairs are held annually. Tokay is celebrated for the superior quality of the wine produced in its vicinity, especially in the Hegyalja, a chain of hills to the N. W. of the town, about 20 m. long, covered with vineyards. The grapes are collected with great care, being plucked one by one when they are ripe. The wine produced is of three descriptions: the essence, or that which runs from the grapes when put into a cask without artificial pressure; the second sort is obtained by applying a slight pressure; and the third by the same amount of pressure that is required in the manufacture of ordinary kinds of wine.

TÖKÖLYI, or Tököli, Imre. See Hungary, vol. ix. p. 359.

TOLAND, John, a British author, born near Londonderry, in Ireland, Nov. 30, 1669 or 1670, died at Putney, near London, March 11, 1722. His parents were Roman Catholics, but he says that he was as zealous against that faith before he was 16 years old as he continued to be ever after. He studied 3 years at the university of Glasgow, received the degree of M.A. at the university of Edinburgh in 1690, was sent by influential English dissenters for two years to the university of Leyden to prepare for the ministry, gained the friendship of Le Clerc and Leibnitz, and then went to Oxford, where he collected materials on various subjects in the Bodleian library, and made himself conspicuous as a free thinker. He published in London in 1696 a work entitled "Christianity not Mysterious," designed to show that no Christian doctrine is contrary to reason, or above it, or can properly be called a mystery. Among the answers which it called forth was the treatise on "Reason and Faith" (1697), by the Rev. John Norris of Sarum. He became acquainted with Locke, and in 1697 went to Dublin, where he was esteemed as a man of parts and learning, but alarmed the clergy and excited the clamor of parties, "not so much by his difference in opinion, as by his unreasonable way of discoursing, propagating, and maintaining it." His book was ordered by the parliament at Dublin to be burned by the common hangman. He returned to London, and, after publishing "An Apology for Mr. Toland," wrote numerous pamphlets and treatises on questions of politics, religion, and literature. Among them were a pamphlet entitled "The Militia Reformed, or an Easy Scheme of Furnishing England with a constant Land Force" (1698); a "Life of Milton" (1698), and a defence of it against a criticism of Dr. Blackall (1699); editions of Lord Holles's "Memoirs" and of Harrington's "Works;" a poem on eloquence entitled "Clito;" and "Anglia Libera" (1701), a treatise on the succession of the crown of England. He visited the courts of Hanover and Berlin, apparently as a political agent, and held a theological discussion with Beausobre. Having returned to England, he professed himself in 1702 "a true Christian" and "a good churchman," and in 1705 declared himself a pantheist, and wrote political pamphlets for Harley, by whom he was sent again in 1707 to Germany and Holland. He remained abroad about 3 years as a secret political spy, ingratiated himself with Prince Eugene in 1710, and was afterward supported for a time by the earl of Oxford (Harley), but at length quarrelled with his patron and wrote pamphlets against him. Among his numerous later publications are treatises with long and fantastic titles, as "Nazarenus, or Jewish Gentile, or Mahometan Christianity, containing the History of the Ancient Gospel of Barnabas, and the Modern Gospel of the Mahometans, attributed to the same Apostle, this last Gospel being now first made known among Christians," &c., which involved him in protracted controversies. During the last 4 years of his life he lodged at Putney, having found a patron in Lord Molesworth. "Never," says Disraeli in his "Calamities of Authors," "has author died more in character than Toland; he may be said to have died with a busy pen in his hand. Having suffered from an unskilful physician, he avenged himself in his own way; for there was found on his table an 'Essay on Physic without Physicians.' The dying patriot-trader was also writing a preface for a political pamphlet on the danger of mercenary parliaments; and the philosopher was composing his own epitaph, one more proof of the ruling passion predominating in death." His posthumous works were published in 2 vols. in 1726 (reprinted, 1747), with a biography by Des Maizeaux. His writings have never been collected, though many of them contain curious and interesting details concerning the history of the times.

TOLDY, Ferencz, M.D., a Hungarian literary historian and critic, born in Buda, Aug. 10, 1805. His original name was Schedel, which he in after life exchanged for his *nom de plume.* He studied medicine at the university of Pesth, and philosophy at that of Berlin, where he also lectured on Hungarian literature, in 1830 made a tour through Belgium, England, France, and upper Italy, and on his return to his country became a member and chief secretary of the Hungarian academy. Having for a number of years been active as a medical writer and professor of hygiene at the university of Pesth, he in 1844 resigned that position, and exclusively devoted himself to the study of the literary history of his nation, which he had long and successfully cultivated. His principal works are: *Handbuch der ungarischen Poesie* (Pesth and Vienna, 1828); *Magyar chrestomathia* (2 vols., Pesth, 1853); and *A magyar nemzeti irodalom története* ("History of the National Hungarian Literature," 3 vols., Pesth, 1851–'5), of which he has also published a German translation. He has, however, been chiefly occupied as editor of the *Athenæum* (in conjunction with Bajza and Vörösmarty, 1837–'44), of the *Uj magyar muzeum* (since 1850), of the "Annals" of the Hungarian Academy and of the "Kisfaludy Society" (as secretary to both), and of the works of Dayka, Czuczor, Kazinczy, the two Kisfaludys, Csokonai, Vörösmarty, and other national authors.

TOLEDO, a city of Ohio, near the western extremity of Lake Erie, 100 m. W. from Cleveland and 60 m. S. W. from Detroit, situated on the estuary of the Maumee river, in lat. 41° 30′ N., long. 83° 32′ W.; pop. in 1840, 1,232; in 1850, 3,829; in 1860, 13,768. It is one of the most important commercial towns on the lakes, possessing a fine harbor and unsurpassed facilities for internal trade. It is well laid out, chiefly on elevated ground, having wide streets, many of which are graded, giving an easy ascent from the harbor to the table land on which most of the houses are built. It has several large and handsome public buildings, and a considerable number of private residences in good style and with tastefully adorned grounds. It is becoming eminently healthful, the deaths for the 3 past years averaging but 2.15 per cent. of its whole population. There are 2 daily and 2 tri-weekly newspapers, and one (German) weekly. There are 13 churches, an Ursuline convent, an orphan asylum, a Bethel church for sailors, 2 banks, 2 private banking houses, a savings bank, large warehouses, railroad machine shops, founderies, 3 flouring mills, and various other manufacturing establishments. Its high school and district schools are liberally sustained, and there is an excellent library belonging to the young men's association. Toledo is accessible to 6,000 m. of lake shore. By canals it reaches S. W. 460 m. to Evansville, and S. 247 m. to Cincinnati. By 6 completed lines of railroad it is connected with Cleveland, Cincinnati, Lafayette, St. Louis, Quincy, Peoria, Chicago, and Detroit. All these railroads concentrate at an immense union depot, which for convenience is not surpassed in the country. The total commerce for the year ending Dec. 31, 1860, was as follows: value of exports, $52,243,627.65; of imports, $46,727,754.69; entrances, 2,133 vessels of 343,114 tons; clearances, 1,936 vessels of 334,503 tons. The enrolled and licensed tonnage of the district was 4,491. Its receipts of breadstuffs, reckoning flour in bushels, in 1861, were 18,706,510 bushels. In provisions and other materials of western commerce, its business was proportionately large.

TOLEDO, a province of Spain, New Castile, bounded N. by Avila and Madrid, E. by Cuenca, S. by Ciudad Real, W. by Caceres; area, 5,620 sq. m.; pop. in 1857, 328,755. The surface is generally mountainous, and there are elevated plains toward the centre. The Tagus flows W. through the middle of the province, and receives many tributaries, the most important of which are the Guadarrama, Alberche, Tietar, Aljoder, and Torcon. Beside these, the Jiguela and its affluents flow toward the Guadiana. Gold, silver, lead, iron, copper, quicksilver, tin, cinnabar, alum, bismuth, coal, and ochre are all found. The soil is generally poor, but in the centre and toward the S. the quality improves. Grain of different kinds, flax, fruit, and vegetables are produced, together with wine, oil, and silk.—Toledo (anc. *Toletum*), the capital, is situated on the N. bank of the Tagus, 2,400 feet above the level of the sea, and 42 m. S. S. W. from Madrid; pop. about 14,000. It stands on a rocky height, upon three sides of which the river flows in a deep and narrow channel, crossed by two stone bridges about 100 feet in height, one of which was built by the Moors and consists of a single arch. The surrounding country is undulating and generally barren, and the heat in summer is very great. Toledo is encircled by two walls, and entered by 9 gates, some of which are highly ornamented. The streets are steep, crooked, and narrow, but are tolerably clean. The houses are generally built in the Moorish style, from 2 to 4 stories high and roomy, with the apartments arranged round a court. The appearance of the city is remarkably picturesque. The cathedral, founded in 1258, stands in the centre of the town, and is one of the finest in Spain. It is of the purest Gothic style, 404 feet long and 204 feet wide, with a spire 324 feet high. The palace of the archbishop (who is the primate of Spain) adjoins the cathedral, and contains a library very rich in ancient manuscripts. The Alcazar, or royal palace, is in a very dilapidated state. The university was suppressed in 1845. The principal manufactures are woollen and silk goods, oil, leather, and the sword blades for which the town is so famous. (See Sword.)—According to tradition, Toledo was founded by Jewish colonists in the 6th century B. C., and called Toledom, "mother of people." It was taken by the Romans in 192 B. C., and some portions of the walls and an amphitheatre erected by them still remain. It was taken by the Goths in A. D. 467, and made the capital of Spain in 567. The Moors captured it in 711, and under them it made great advances. Alfonso VI. of Castile and Leon wrested it from the Moors after a terrible siege in 1085, when it was again made the capital of the Christian kings, and at one time had a population of 200,000. It afterward suffered many sieges, which, together with the removal of the court to Madrid, have been the chief causes of its decline. It was occupied by the French from 1808 to 1813.

TOLLAND, a N. E. co. of Connecticut, drained by the Willimantic and Hop rivers; area, 440 sq. m.; pop. in 1860, 21,187. In the W. part the surface is nearly level and the soil fertile, but the E. part is very hilly and the soil inferior. The productions in 1850 were 127,873 bushels of Indian corn, 81,429 of oats, 204,353 of potatoes, 38,992 tons of hay, 381,165 lbs. of butter, and 264,698 of cheese. There were 14 cotton and 19 woollen factories, 38 hat and cap manufactories, 5 founderies, 1 glass and 8 hardware factories, 8 machine shops, 7 grist mills, 4 saw and planing mills, 9 sewing silk and 2 thread manufactories, 4 paper mills, 9 tanneries, 41 churches, 2 newspaper offices, and 4,346 pupils attending public schools. It is intersected by the Hartford, Providence, and Fishkill, and the New London northern railroads. Capital, Tolland.

TOLLENDAL. See Lally-Tollendal.

TOLLENS, Hendrik Corneliszoon, a Dutch poet, born in Rotterdam, Sept. 24, 1780, died in 1856. His first poems were songs which he wrote for a patriotic society after the French entry into Holland. He published volumes of minor poems in 1800 and 1802, and in 1805 the drama of "Lucretia," which was prohibited by the government. Another tragedy, *De Hoekschen en Kabeljaauwschen* ("Hooks and Codfish"), was founded on the hostilities of two Dutch factions which were so named in the 14th and 15th centuries. His popularity began with the appearance of a collection of his poems in 1808, one of which, "To a Fallen Maiden," was specially admired; and he became the favorite national poet, and the head of the school of Rotterdam. For the third edition of his poems (1817), many of which are on national and domestic subjects, there were more than 10,000 subscribers. He afterward published *Nieuwe Gedichten* (1821 and 1829) and *Volksliederen* (1833), and before his death prepared a new and complete edition of his works (5 vols., 1853-'5). On his 70th birthday the king of Holland sent him his congratulations through the minister of justice, and created him commander of the order of the lion of Holland; a gold medal was struck in his honor; and a fund was formed for the commemoration of his name by a charitable institution.

TOLTECS, or Toltecas (Aztec, *Tulhuatecas*), the inhabitants of Anahuac (Mexico) prior to the arrival of the Aztecs, and the founders of the ancient Mexican civilization. Their capital was Tula, N. of the valley of Mexico, where on the arrival of the Spaniards remains of extensive buildings were still to be seen. Many other ancient ruins throughout Mexico are attributed to them, and the name Toltec has there become synonymous with architect. By the general agreement of the traditionary legends of the nations that succeeded them, says Prescott, "the Toltecs were well instructed in agriculture and many of the most useful mechanic arts; were nice workers of metals; invented the complex arrangement of time adopted by the Aztecs; and, in short, were the true fountains of the civilization which distinguished this part of the continent in later times." According to the tradition which has generally been followed, they migrated from the north some time in the 7th century A. D., found Anahuac occupied by a savage race, whom they subdued and instructed in their own civilized arts, and established their dominion over the whole country; but 4 centuries after their immigration, reduced by famine, pestilence, and unsuccessful wars, the great body of them departed southward, and founded in Chiapas and Guatemala the cities whose ruins still excite the wonder and admiration of travellers. Later investigations, however, have led to the supposition that their original seat was in the latter region, and that of the Aztecs still further south. (See Aztec.) A few of the Toltecs still remained in Anahuac on the arrival of the Chichemecs, Aztecs, and other tribes, who, while adopting their civilization, engrafted upon it savage rites and practices to which the Toltecs were strangers.

TOLU, Balsam of. See Balsams.

TOMATO (*lycopersicum esculentum*, Dunal), a plant of the nightshade family, natural order *solanaceæ*, the fruit of which, possessing an agreeable acid flavor, is employed in various ways for the table. It is supposed to have originated in South America, and to have been early cultivated in Mexico and Peru. Several varieties were known in England in Gerarde's time (1597), and Parkinson in 1656 speaks of them as garden curiosities under the names of love apples, amorous apples, and golden apples, more for their beauty than for any supposed use. On the continent Dodoens, a Dutch herbalist, in 1588 mentions them as vegetables to be eaten with pepper, salt, and oil. Rumphius in his *Herbarium Amboiense* (1755) speaks of two kinds called *tomatls*, used in cooking among the Malays; and the word *tomatl* is applied to several species of *solanum* among the Mexicans. Formerly they were called *pomi d'oro* by the Italians, and now are known as *pomi d'amore* and extensively cultivated around Naples and Rome. The several varieties are known by the form and color of the fruit, and each was described as a distinct species by Dunal, who examined them structurally and noticed their distinctive characteristics in his "Natural History, &c., of the Solanum" (Montpellier, 1813), but which nevertheless can be referred to a common type, viz., the large red tomato, with deeply divided, rough, hairy leaves, and clusters of yellow flowers, succeeded by large, lobed fruit of an orange-red or scarlet color when ripe. The mode of growth in stem, foliage, and flower is indeed much the same in every variety, the plant being annual, with long, prostrate, branching stems, of a grayish hue and viscid-pubescent; leaves of the same character, unequally pinnate, the leaflets deeply cut, acuminate, glaucous beneath; flowers in naked lateral clusters, supported on a common, slender, fork-branched peduncle; calyx with 5 or 6 segments; corolla rotate, 5 or 6 cleft, yellow, pubescent; stamens 5, with conical anthers, which are connate at their extremities and dehisce lengthwise; fruit a berry of 2 or 3 cells, with flat, hairy seed enveloped in a juicy pulp. The small red tomato has a globular fruit, somewhat flattened near the stem and at its apex. The pear-shaped tomato is ovate and tapering toward the stem; it is tender and ripens more tardily. The cherry tomato has a small, round, red fruit, possessing a sprightly acid flavor, but on account of its size used chiefly for pickling. The large yellow tomato is nothing but a variety of the large red, and the small red a variety of the cherry tomato, as likewise the fig tomato, which when dried is prepared as a sweetmeat. Some much improved varieties of the tomato are at present in great repute, such as the perfected tomato, with large juicy fruit of either a scarlet color or else a crimson tinted with violet. The upright tomato is recommended because its stems are erect and its habits are better suited to small gardens. A species (*L. Humboldtii*) was introduced to notice, being brought from Peru, about 40 years since, which is said to be a perennial.—The tomato is readily raised from seeds or from cuttings, but the former is the usual mode, sowing in hot-beds or sheltered frames in March, and transplanting into the open ground when the weather permits, cold and frost being destructive to the young plants. A light, rich mould, upon a porous subsoil, is preferable, and a warm sunny exposure will be found advantageous. The plants as they grow may be supported by a low framework, and even training upon trellises or against sunny walls can be recommended where early fruits are wanted. The process consists in tying or nailing the branches as they grow and nipping off the lateral shoots, but carefully preserving those leaves which are near the flowers. The fruit of the earliest and best, well ripened, should be selected for seed.

TOMBIGBEE, **Tombigby**, or **Tombeckbee**, a river of Mississippi and Alabama, which rises in Tishemingo co. in the N. E. extremity of the former state. It first flows S. to Columbus, thence S. E. to Demopolis, Ala., where it receives the Black Warrior on the left, and thence generally S., with many and sudden windings, to its junction with the Alabama, about 45 m. from Mobile, where the united stream takes the name of Mobile river, and falls into Mobile bay about 30 m. from the gulf of Mexico. Its length is estimated at 450 m., and it is navigable for large steamboats to Columbus, 366 m. from the mouth of Mobile river, and for smaller boats to Aberdeen, about 50 m. further up.

TOMLINE, **George**, an English prelate, eldest son of George Pretyman, born in Bury St. Edmunds, Oct. 9, 1750, died in Sept. 1827. He was educated at Cambridge, and in 1773 became tutor to William Pitt, and in 1782 his private secretary when the latter was made chancellor of the exchequer. When Pitt became first lord of the treasury, Pretyman was made his secretary, and remained with him till 1787. After having received various preferments, he was made in 1787 bishop of Lincoln and dean of St. Paul's, and in 1820 was transferred to the see of Winchester. In 1803 Bishop Pretyman assumed the name of Tomline in consequence of having received by will an estate from Marmaduke Tomline, who was no way related to him. He published "The Elements of Christian Theology" (2 vols.), "A Refutation of Calvinism," and "Memoirs of William Pitt" (3 vols. 8vo.).

TOMMASEO, **Nicolo**, an Italian author and revolutionist, born in Sebenico, Dalmatia, in 1803. He was educated in Italy, and spent several years in Florence, where he was one of the most active writers for the *Antologia;* but, suspected by the Austrian government, he went in 1833 to France. After the amnesty of 1838 he engaged in literary pursuits in Venice. At the end of 1847, he along with Manin signed a petition to the emperor for a milder exercise of the censorship; and in Jan. 1848, the popularity of these two leaders of the national party caused their arrest and imprisonment. The uprising of the people effected their release in March, and Tommaseo became a member of the provisional government. From this he withdrew in June, but in August returned as minister of public instruction; and he made two unsuccessful journeys to Paris to secure the aid of the French republic. After his return in Jan. 1849, he lost his influence in Venice almost entirely, in consequence of his moderate views, but on the capitulation of the city he was one of the 40 patriots who were exiled. Since that time he has resided chiefly in Corfu and Turin. Tommaseo is one of the most eminent of the writers of young Italy who have sought to unite the religious principles of Catholicism with liberty and liberal opinions. Of his numerous writings the most important are: *Nuovo dizionario dei sinonimi della lingua Italiana* (Florence, 1832; new ed., 1839-'40); a commentary upon Dante (Venice, 1837); a collection of papers of the Venetian embassy bearing upon the history of France during the 16th century (2 vols., Paris, 1838); *Nuovi scritti* (4 vols., Venice, 1839-'40); *Studj critici* (2 vols., Venice, 1843); and *Lettere di Pasquale de' Paoli* (Florence, 1846), with a valuable history of Paoli's life, and of the war for Corsican independence. He has also made a collection of popular songs, Tuscan, Corsican, Dalmatian, and Greek, under the title of *Poesie popolari Italiane* (4 vols., Venice, 1839-'42), with historic notices.

TOMPKINS, a central co. of New York, drained by several tributaries of Cayuga lake, the head of which lies in the N. part of the county; area, 506 sq. m.; pop. in 1860, 31,411. The surface is hilly, the valley of the lake being 700 feet below the ridges on either side, and the soil is generally best adapted to grazing. The productions in 1855 were 117,048 bushels of wheat, 372,202 of Indian corn, 82,816 of barley and rye, 812,983 of oats, 74,303 of buckwheat, 111,106 of potatoes, 417,757 of apples, 31,843 tons of hay, 79,932 lbs. of flax, 27,090 of tobacco, 1,645,947 of butter, and 160,834 of wool. There were 28 grist mills, 97 saw mills, 44 tanneries, 9 furnaces, 3 woollen factories, 2 paper mills, 2 oil cloth factories, 66 churches, and 4 newspapers; in 1859 there were 11,913 pupils attending public schools. Cayuga lake supplies water communication with the Erie canal. The Cayuga and Susquehanna railroad passes through the county. Capital, Ithaca.

TOMPKINS, Daniel D., an American statesman, born at Scarsdale, Westchester co., N. Y., June 21, 1774, died on Staten island, June 11, 1825. He was graduated at Columbia college in 1795, studied law, was admitted to the bar in New York in 1797, and soon attained a high position both in and out of his profession. In 1801 he was elected a member of the legislature, and also of the convention for revising the state constitution. In 1804 he became a member of congress from the city of New York, and the same year was appointed one of the associate justices of the supreme court of the state. In 1807 he was elected governor of New York, and continued to fill that office by reëlection till 1817, when he resigned in consequence of his election as vice-president of the United States; in 1820 he was reëlected to the latter office, which he held till March 4, 1825. During the war of 1812, by his exertions in calling out troops and sending them into the field, he contributed largely to the national success. In 1812 he prorogued the state legislature for 10 months, to prevent the establishment of the bank of America in the city of New York, which was intended to take the place of the old United States bank. This measure gained him great popularity at the time, but did not in the end defeat the charter of the bank, which was passed in 1818. In a special message to the legislature, dated Jan. 28, 1817, he recommended the total abolition of slavery in the state of New York; and an act for that purpose was accordingly passed, to take effect July 4, 1827.

TOMSK, a government of Western Siberia, bounded by Tobolsk, Yeniseisk, the Chinese empire, and the Kirgheez territory, from which it is separated by the Irtish; area, 189,472 sq. m.; pop. in 1856, 687,677. The Altai mountains extend along the S. part, and the surface descends toward the N. The river Obi rises in the S. of the government, flows N. W., and receives numerous tributaries, the chief of which are the Bia, Tchumish, Tom, Tchulim, and Ket. There are several lakes of considerable size, particularly in the west. Gold, silver, copper, lead, and iron are all found in the mountains of the S., and extensively worked. A great deal of the N. part of the province is barren, and only supports the slender flocks and herds of some nomadic tribes; but toward the S. the pastures become luxuriant, and abundant crops are raised, but cattle constitute the principal wealth of the people. The population is composed of Russians, Cossacks, Tartars, and Ostiaks. The principal towns, beside the capital, are Biisk and Kolyvan on the Obi, and Ust-Kamenogorsk and Semipalatinsk on the Irtish.—Tomsk, the capital, is situated on the right bank of the river Tom, in lat. 56° 29′ N., long. 85° 10′ E., 610 m. E. from Tobolsk; pop. about 10,000. It consists of an elevated part which stands upon hilly ground, and a lower town or suburb; the former is principally inhabited by Russians, and the latter by Tartars and people from Bokhara. There are manufactures of coarse cloth, leather, and soap; and a considerable traffic is carried on with the Calmucks and Ostiaks in cattle, furs, fish, &c., for which European, Bokharian, and Chinese goods are exchanged. The great road leading to the frontier of China passes through the lower town.

TON, or Tun, a denomination of weight, equal to 20 cwt. or 2,240 lbs., and also (usually with the second orthography) a liquid measure of 252 gallons; also applied to dry measures and solid measures of various capacities. The tons used by different nations in shipping are often entirely different from their ordinary measures of the same name. In common use, the ton weight is often rated at 2,000 lbs., when it is termed the "short ton;" but by act of congress, when not specified to the contrary, the ton is to be understood as 2,240 lbs. The different values of the ton weight involve great confusion in commercial transactions. Mr. Alexander, in his "Universal Dictionary of

Weights and Measures" (Baltimore, 1850), gives 50 different kinds of tons, and there are some used for coal, and perhaps others also, which he does not name; thus in Maryland the ordinary ton is 2,000 lbs., the usual coal ton 2,240 lbs., and the miner's ton, according to which he is paid, is 2,470 lbs., the allowance being for waste. The shipping ton of France was by the old standard 2,158.43 lbs., and the metrical ton is 2,204.74 lbs.; of Spain, 2,032 lbs.; of Portugal, 1,755.8 lbs. The measurement ton for shipping is in the United States 40 cubic feet; in China and India, 50; in Portugal, 73.8; in France, 50.842; and in Hamburg, 83.219. As a measure of dry capacity, there are in Germany, Holland, and Sweden not fewer than 6 different tons, varying from 8.04 to 5.18 bushels; while the shipping tons of Portugal, France, and Italy range from 41.43 to 43.98 bushels. The liquid tun measure is quite as varied in Europe, and as applied to different articles, as wine, beer, &c. In England the tun for wine is 252 gallons, and for beer 263.7 gallons. Of the vessels called tuns, the most famous is that known as the great tun of Heidelberg, the capacity of which is 283,200 bottles of wine; but it has remained empty since 1769.

TONE, Theobald Wolfe, an Irish revolutionist, born in Dublin, June 20, 1763, died in prison there, Nov. 19, 1798. He was educated at Trinity college, Dublin, and in 1785, before he had completed his course, made a runaway marriage, which turned out happily. Early in 1787 he went to London and entered the Middle Temple, and in 1789 was called to the bar. He disliked the profession extremely, and paid too little attention to it to be successful. In defence of the whig club he published at this time his first pamphlet, "A Review of the Last Session of Parliament." Not long afterward, on the appearance of a rupture with Spain, he wrote a pamphlet to prove that Ireland as an independent nation was not bound by a declaration of war. Embracing the liberal ideas to which the French revolution had given life and power, he actively devoted himself to the task of effecting a union against the government between the Catholics of Ireland and the dissenters, and in 1791 addressed to the latter a pamphlet entitled "An Argument on behalf of the Catholics of Ireland," which was very successful. The same year he assisted in founding the first club of "United Irishmen" at Belfast, and in forming them in other parts of Ireland. But as these clubs soon became perverted from their original aims of Catholic emancipation and parliamentary reform to the more extreme measures for revolutionizing the country, he lost in them almost all his influence. In 1792 he succeeded Richard Burke, the son of Edmund Burke, as the secretary and agent of the Catholic committee, and subsequently became implicated in the proceedings of Jackson, sent from France to sound the sentiments of the Irish. By a kind of compromise with the government, he was allowed to retire from the country, and in 1795 came to the United States, where he lived in succession at Philadelphia, West Chester, and Downingtown, Penn., and at Princeton, N. J. Urgent letters from Ireland, stating that that country was ripe for a revolt, induced him to sail for France in Jan. 1796, to gain the aid of the directory; and owing in large measure to his exertions, that government determined to fit out a powerful expedition, the command of which was given to Hoche. In July Tone received his commission as *chef de brigade*, and was also made an adjutant-general to Hoche, whom he accompanied in Dec. 1796, in the armament destined for Bantry bay. The fleet was scattered by storms, and Tone was unable to persuade the French government to undertake another expedition on a large scale. In 1797 he was attached to the Bavarian army; and, still persevering in the project of raising an insurrection in his native land, in Sept. 1798, he accompanied a petty squadron destined for Ireland, which was intercepted and defeated by an English squadron under Sir John Borlase Warren. After fighting desperately, Tone was taken prisoner. He was not at first recognized, but at Letterkenny was placed in irons, taken to Dublin, tried by court martial, and sentenced to be hanged on Nov. 12. On the 11th he cut his throat with a penknife, and died in consequence a few days afterward. His autobiography, with a diary kept during his residence in France, was published by his son, William Theobald Wolfe Tone (Washington, 1826), who was an officer in the army of Napoleon, and after his fall in that of the United States.

TONGATABOO. See Friendly Islands.

TONGUE, the symmetrical organ, situated on the median line, at the commencement of the alimentary canal, ministering to the senses of touch and taste, variously used in the collection and preparation of the food for deglutition, and the principal instrument in the articulation of sounds. Taking the tongue of man as an example, the organ is attached at its base to the movable hyoid arch of bones, and suspended and kept in place by muscles from the skull, sternum, and scapula; it is essentially composed of muscular fibres, which move freely its various portions; it is covered by very sensitive mucous membrane, containing numerous mucous glands and follicles; fibrous, areolar, and fatty tissues enter into its structure, which is freely supplied with blood vessels and nerves. The size varies, bearing no relation to the height of the individual, but proportioned to the capacity of the alveolar arch; it is, therefore, smaller in women than in men. It follows about the direction of the lower jaw in its anterior half, and behind that curves downward and backward to the hyoid bone; it is free except at the posterior extremity and the posterior ⅓ of the lower surface; from the base to the epiglottis extends a fold serving to limit the movements of the latter organ, and from the sides of the base to the soft palate 2 folds on each side, the pillars of the fauces, between which are situated the tonsils; under the anterior free extremity is the frenum which connects it with the lower jaw, a fibrous and mucous lamina or ligament, sometimes so short congenitally as to prevent the free movements of the tongue and to require an operation for its division. There is a more or less distinct longitudinal furrow on the median line, from which extend outward and forward numerous other lines whose angle of union points backward; the posterior 3d is smooth and without compound papillæ, exhibiting a few simple ones and the nodular eminences of the numerous muciparous glands; in front of this is a V-shaped ridge, the angle directed backward, formed by 2 converging lines of button-like eminences, the circumvallate papillæ; in front of these, and occupying the anterior ⅔ of the organ, are the fungiform and conical or villiform papillæ, the former spheroidal, red, and scattered, the latter very numerous. The osseous support of the tongue is the U-shaped or hyoid bone, consisting of a base or median body, 2 greater and 2 lesser cornua, and placed in the neck between the lower jaw and the thyroid cartilage; it is the homologue of a very complex apparatus in the lower vertebrates. The muscles constitute the chief bulk of the tongue, and perform its functions in prehension, mastication, deglutition, and speech; they are arranged in a complicated manner, so as to mutually support each other, rendering the movements of the organ exceedingly varied and extensive; they are attached to the submucous fibrous tissue, which is firm and thick on the superior surface. The mucous membrane is invested with a delicate scaly epithelium, the superficial layer of which readily and constantly falls off. The papillæ are much like those of the skin, most being compound organs, in their nervous and vascular supply; the circumvallate are 6 to 10 in number, and sometimes ⅛ of an inch in diameter; the fungiform are $\frac{1}{20}$ to $\frac{1}{30}$ of an inch in diameter, and vary greatly in number, perhaps accounting for the well known diversity in the acuteness of the sense of taste in different individuals; the filiform are the most numerous, closely set like the pile of velvet, covering the anterior ⅔ of the tongue, and the seat of what is called the fur; their epithelium frequently breaks up into hair-like processes, having their imbrications directed backward, which mark a physiological distinction between the sentient circumvallate and fungiform papillæ and the protective and motor filiform and conical ones. The conical papillæ are generally regarded as tactile, the fungiform and circumvallate as gustatory (acutely tactile), and the filiform as the homologues of the recurved spines of the tongue of the cats, and as principally concerned in regulating the movements of the food in order to bring it within the reach of the muscles of deglutition. The principal arteries of the tongue are the lingual branches of the external carotid; the sensory nerves are the lingual branch of the 5th pair of trifacial and the glossopharyngeal, distributed respectively to the anterior and posterior portions, and the motor nerve is the hypoglossal; for their functions see TASTE. The tongue in fishes is rudimentary, and not endowed with any great sensibility or motile power; in reptiles it varies greatly in length, size, and movability, being in some immovable or short and thick, in some remarkable for slenderness and length (as in serpents), and in others for protractility (as in the chameleon and frog); in them it is usually an organ of prehension and not of sensation. The tongue in birds is also prehensile and not gustatory, and generally provided at the base with numerous spines directed backward to prevent the return of food; though itself incapable of elongation, it may be remarkably protruded by the action of the muscles attached to the very long and movable hyoid bones. In some mammals, as the giraffe and ant-eater, it is capable of great elongation, and is an important organ of prehension; the recurved spines of the cats have been referred to, and constitute efficient instruments for cleaning flesh from bones and for combing their fur. In man the tongue is not, properly speaking, prehensile, but is engaged in the acts of suction and drinking, as every one knows; it keeps the food during mastication within the range of the teeth, collects it from all parts of the mouth preparatory to swallowing, and is also concerned in the commencement of deglutition; and it is the principal organ of speech. It is liable to inflammation, enlargement, atrophy, ulcerations, tumors, and malignant diseases. The fur in disease depends on a sodden and opaque condition of the epithelium of the filiform and conical papillæ, arising from an alteration of the mucus and saliva of the mouth, the bright red color of the fungiform presenting a striking contrast; the amount, color, and arrangement of the fur are symptomatic of various morbid changes in the system of interest to the physician, though there is great variety within the limits of health. The papillary surface is healed and repaired with great readiness and perfection.

TONIC (Gr. *τονοω*, to strengthen), a medicine used for increasing permanently the strength of the organic actions of the different systems of the animal economy, giving a durable exaltation to the energies of all parts of the frame, without necessarily producing any apparent increase of the healthy actions. Extracts of bitter substances (see BITTER PRINCIPLES) are much used for this purpose, as also tincture of iron, arsenic, and the like.

TONNA, CHARLOTTE ELIZABETH, better known by her *nom de plume* of "Charlotte Elizabeth," an English authoress, born in Norwich in 1792, died in London, July 12, 1846. She was the only daughter of the Rev. Michael Brown, rector of St. Giles's, Norwich, and a canon of the cathedral. She injured her health in childhood by intense study. She was first married to Capt. George Phelan of the British army, with whom she resided in Nova Scotia for 2 years, and subsequently for 5 more in Ireland. Her husband becoming insolvent, and finally insane, she was compelled to resort to literature for a livelihood, and wrote numerous religious narratives and tales, which were very popular, and still remain so. In 1841 she was married a second time to Mr. L. H. J. Tonna of the united service institution, whose sympathy with her literary pursuits stimulated her to new exertions. Of her works, nearly 50 in number, the titles of those best known are: "Judah's Lion," "Judæa Capta," "Helen Fleetwood," "Personal Recollections," "Chapters on Flowers," "Glimpses of the Past," "Principalities and Powers," "The Siege of Derry," "Count Raymond of Toulouse," "The Deserters," and "Wrongs of Women."

TONQUIN. See ANAM.

TONQUIN, GULF OF, an arm of the China sea, having the province of Tonquin on the W, the Chinese province of Quang-tung on the N. and E., and the island of Hainan on the S. E.; length, 300 m.; average width, 150 m. The Sangkoi or Tonquin river and several smaller streams flow into it. It has numerous islands. The typhoons are very violent in the gulf.

TONSILS, or AMYGDALÆ, a collection of mucous follicles situated in the throat on each side in the interval between the pillars of the fauces. They are almond-shaped, with the larger end directed upward; hence their Latin name given above, and the popular one of "almonds of the throat." They vary in size in different individuals, being generally the largest in scrofulous constitutions; their excretory ducts terminate in small sacs imbedded in their substance, and open on the mucous membrane, their secretion serving to lubricate the parts concerned in deglutition. They are well supplied with blood from the facial, inferior pharyngeal, and internal maxillary arteries, and there is a considerable network of veins around them; they receive numerous nervous filaments from the glosso-pharyngeal, par vagum, and trifacial. The external surface is adherent to the superior constrictor of the pharynx, while the internal is free and prominent; the carotid artery is behind and to the outside, which must be borne in mind in puncturing the abscesses to which they are very subject. These organs are liable to acute and chronic inflammations, with the exudation of whitish and tenacious false membranes, and great enlargement, often impeding respiration and deglutition. Their common acute inflammation is popularly called quinsy and inflammatory sore throat; it generally arises from taking cold, and begins with difficulty of swallowing and a sense of a foreign body in the throat, and is soon followed by chills and heat, and painful viscid expectoration; it commonly declines in 3 or 4 days under simple antiphlogistic treatment and astringent gargles; if the inflammation does not subside, the swelling largely increases, often threatening suffocation, which is sometimes avoided only by the puncture or spontaneous rupture of the abscess. The enlargement of scrofulous and chronic inflammation requires a similar treatment, with the addition of tonics and alteratives, detergent gargles, stimulating and astringent applications, and, as a last resort, excision by the bistoury or a special instrument called tonsillotome. A noisy respiration during sleep in scrofulous children in many cases will indicate chronic enlargement of the tonsils. They are also the seat of phosphatic calculi, and from their mucous follicles are often cast out soft and fetid concretions.

TONSTALL. See TUNSTALL.

TONSURE (Lat. *tondo*, to clip), the name given to a mark distinguishing the clergy of the Roman Catholic and the eastern churches from the laity, and formed by cutting off a portion or the whole of the hair from the head. During the first 5 centuries the tonsure of the clergy was entirely unknown, and the practice of shaving the head or wearing the hair too short is in fact condemned in priests by Jerome and others of the fathers. But in the latter part of the 5th century the monks began to clip the hair in a conspicuously deforming manner, or to shave the entire head, partly in order to show their contempt of the world, partly for the express purpose of exposing themselves to ridicule. From the monks the tonsure gradually passed over to the secular clergy, and in the 6th century it began to prevail throughout the church. Different forms were in use in the national churches of Europe. The tonsure of the Roman church, also called *tonsura Petri*, consisted in shaving the entire head and leaving only a circular crown of hair. This form was soon adopted in Spain, France, and Germany. Pope Gregory II., in 721, made it obligatory for all priests under the penalty of excommunication, and in Spain it was regarded and enforced as a mark of orthodoxy, in distinction from the tonsure of the heretics, who used to shave only a small circular part of the occiput. Later, however, this custom of the heretics prevailed again in Germany and other northern countries from climatic reasons, and is still in use. Many regulations with regard to the shape of the tonsure were made in the course of centuries, but they often came to be disregarded. The clerical crown must be preserved by repeated trimming when necessary, and the ecclesiastical law provides that it be enlarged as the wearer rises in ecclesiastical station and dignity. The priests of Scotland and Ireland adopted, until the 8th century, a tonsure in the shape of a crescent on the forehead (*tonsura Sancti Jacobi* or *Simonis Magi*), which horrified the Roman missionaries, and had to give way to the Roman form. The tonsure of the eastern churches, in ancient times, consisted in shaving the entire head (*tonsura Pauli*). A complete history of the tonsure is given in Thomassin's *Vetus et Nova Ecclesiæ Disciplina*.

TONTINE, a kind of life annuity originated by Lorenzo Tonti, a Neapolitan, who published his scheme and introduced it into France about the middle of the 17th century. The subscribers were divided into 10 classes according to their ages, or were allowed to appoint their representatives, who were thus classed, and an annuity was apportioned to each class according to their age, the survivors having the benefit of an increased annuity as their associates died, and the last survivor receiving the entire annuity of the class till the close of his or her life. The first association of this kind was founded under the administration of Cardinal Mazarin in Nov. 1653, and was called the "Royal Tontine." The total sum paid in was 1,025,000 francs, in 10 classes of 102,500 francs each. The subscription was 300 francs, and every subscriber received the interest of his investment until the death of some member of the association increased the dividend to the rest, and after the death of the last subscriber it reverted to the state. This project was not successful, nor were two others subsequently proposed by Tonti. In 1689 Louis XIV., finding his finances embarrassed, authorized another of 1,400,000 francs divided into 14 classes, according to age, from children of 5 years to adults of 70. In 1726 the last survivor of the 13th and 14th classes was the widow of a poor surgeon who had invested in two tontines her little capital of 300 francs, and who enjoyed at her death, at the age of 96, an income of 73,500 francs. Tontines were again resorted to by the French government in 1733 and 1734; but in 1773 they were interdicted as a measure of finance. In 1791 a tontine called the *Caisse Lafarge*, on a more extended scale, was established under private management; but by a gross blunder or fraud, the interest promised was an impossible one, and the subscribers, whose united contributions amounted to 60,000,000 francs, never received even simple interest, and the entire capital was lost in the disasters of the time. In England tontines have been occasionally resorted to as a measure of finance, the last opened being in 1789, on which £42,032 interest was still paid in 1859. In the United States tontines have never been made a revenue measure by the government; but in several cities there have been private annuities of this kind. A tontine building was erected in Wall street, New York, in 1792-'4, 203 shares of $200 each being subscribed by an association of merchants. In Albany, New Haven, and some other cities, buildings have been erected on the same plan.

TOOELE, a W. co. of Utah territory, bordering on Nevada territory, intersected by tributaries of Humboldt river; area, about 10,000 sq. m.; pop. in 1860, 1,008. The surface in the E. and W. is mountainous, and the Humboldt mountains cross the W. end from N. to S. Along the streams there are several fine valleys of extraordinary fertility and beauty, but the mountain regions are rough and unproductive. Fremont's route to the Pacific traverses the county. Capital, Tooele.

TOOKE, John Horne, an English political leader and philologist, born in Westminster, June 25, 1736, died March 18, 1812. He was the son of John Horne, a poulterer; but as his father had become wealthy, he was educated at Westminster school, at Eton, and at Cambridge university, became an usher in a school at Blackheath, and much against his own wishes, but in obedience to his father's will, took orders and obtained a curacy in Kent. His preference was so strong for the law, that in 1756 he entered as a student at the Middle Temple; but in 1760 he returned again to the church, and was ordained priest, and for 3 years discharged the duties of that office in the chapelry of New Brentford. He then went to France as travelling tutor to the son of Elwes the miser. In 1765 he began his political life by writing a pamphlet in favor of Wilkes and his party; and on a second tour to the continent he formed at Paris an intimate acquaintance with that politician. During these travels he gave up his clerical profession, and, with the exception of a short time after his return, never resumed it. He took an active interest in political matters, especially in securing the election of Wilkes from Middlesex, and in the agitation which that event created throughout the kingdom. He claimed the authorship of the celebrated reply to the king made by Beckford, then lord mayor of London, in 1770. (See Beckford, William.) In 1769 he was one of the founders of the society for supporting the bill of rights; but its financial affairs involved him in a quarrel with Wilkes, which affected his popularity. In 1771 he received, after considerable opposition, his degree of M.A. from the university of Cambridge, and in consequence of his quarrel with Wilkes was attacked by Junius, against whom he defended himself with unexampled success. In 1773, designing to study law, he formally resigned his living. In resisting with great vigor, and as was thought at the time with great success, an enclosure bill, which according to custom was to be hurried through the house of commons, he gained the favor of Mr. Tooke of Purley, who assured him that he should be his heir; but, though in 1782 he changed his name to Tooke out of regard for his patron, he never received more than £8,000 from the property. He bitterly opposed the American war, and published an advertisement for a subscription for the widows and orphans of the Americans "murdered by the king's troops at Lexington and at Concord." The ministry prosecuted him for libel, and the trial took place at Guildhall in July, 1777. The defence was conducted by himself, but he was found guilty and sentenced to one year's imprisonment in the king's bench, and a fine of £200. During his confinement he published his celebrated "Letter to Mr. Dunning," in which he critically examines the case of the King *vs.* Lawley, which had been used as a precedent against him on his trial. The discussion rendered necessary some philological criticisms upon the prepositions and conjunctions of the English language, as he declared that he had been made "the victim of two prepositions and a conjunction," which particles he calls "the abject instruments of his civil extinction." After his release from imprisonment in 1779, he applied for admission to the bar, but was rejected on the ground of being a clergyman. His prospects of professional success were therefore at an end. Embittered still more against the government, he published in 1780, in conjunction with Dr. Price, a pamphlet entitled "Facts," severely reflecting upon Lord North and his prosecution of the American war, addressed to landholders, stockholders, and others. Soon afterward he retired from London to a farm in Huntingdonshire; but there he caught an ague which disgusted him with agricultural pursuits, and he returned to the city and plunged once more into political life. In 1786 appeared the first part of his "*Επεα πτεροεντα*, or the Diversions of Purley," a strange combination of etymology, metaphysics, and politics, which has exercised a marked influence on English philology. The object of Tooke was to prove that all parts of speech, including particles, could be resolved into nouns and verbs; and that all words expressing operations of the mind, however delicate, were originally applied to objects of external perception. According to Bunsen, "he ably developed, among some doubtful speculative theories, very pregnant views respecting the origin of inflexions, suffixes, and formative words, a most important part in the comparative analysis of languages." In 1787 he published "A Letter to the Prince of Wales" in regard to his supposed marriage with a Roman Catholic. In 1788 appeared a pamphlet from his pen entitled "Two Pair of Portraits," in which he drew a contrast between the two Pitts and the two Foxes, not much to the credit of the latter. In 1790 he was a candidate for the representation of Westminster, against Fox and Lord Hood, and, though spending nothing, polled 1,700 votes. In 1794 he was tried for high treason, mainly on the ground of his participation in the action of the "Constitutional Society," in which the society for the support of the bill of rights had been merged shortly after his quarrel with Wilkes. During the proceedings he conducted himself with great firmness and courage, and was acquitted. He was defended by Gibbs and Erskine, to whom he dedicated the second volume of his "Diversions of Purley," which appeared in 1805. In 1796 he became again a candidate for parliament from Westminster, but was again unsuccessful, though polling 2,800 votes. In 1801 he obtained a seat in the house, being returned by Lord Camelford for the nominal borough of Old Sarum. This was a strange proceeding for so strenuous an advocate for parliamentary reform; but the decision of that parliament that a clergyman could not thereafter sit in the house of commons disqualified him from obtaining any position in future. The latter years of his life were spent at Wimbledon. He was never married, but left several illegitimate children, to one of whom he bequeathed his property. His life was written by A. Stephens (2 vols. 8vo., 1813).

TOOKE. I. William, an English clergyman, born Jan. 18, 1744, died in London, Nov. 17, 1820. In 1771 he became minister of the English church at Cronstadt, and in 1774 chaplain to the factory of the Russian company at St. Petersburg, and remained in that situation until 1792, when he returned to England. His most important works are: "A Life of Catharine II." (3 vols. 8vo.); "A View of the Russian Empire" (3 vols.); and "A History of Russia from the Foundation of the Empire to the Accession of Catharine II." His other works are chiefly novels, miscellaneous essays, and translations. II. Thomas, an English political economist, son of the preceding, born in St. Petersburg in 1774, died in London, Feb. 26, 1858. In 1838 he published "A History of Prices and of the State of the Circulation from 1793 to 1837, preceded by a brief Sketch of the State of the Corn Trade in the last two Centuries" (2 vols. 8vo.). Four additional volumes were afterward published, bringing down the work to the year 1856. III. William, brother of the preceding, born in St. Petersburg in 1777, studied law, and for many years practised as solicitor in London. He edited anonymously in 1804 the poetical works of Churchill, republished in 1844. In 1855 he published "The Monarchy of France, its Rise, Progress, and Fall" (8vo.).

TOOLA, or Tula, a central government of Russia, bounded by Moscow, Riazan, Orel, and Kalooga; area, 11,772 sq. m.; pop. in 1856, 1,125,517. The surface is generally flat. The most important rivers are the Oka, Upa, and Don, the two latter of which are connected by the Ivanovska canal, which forms part of the system that unites the Baltic, Black, and Caspian seas. The soil is fertile, and about ⅔ of the surface is cultivated. Iron and woollen and linen goods are manufactured.—Toola, the capital, is situated on the Upa, 107 m. S. from Moscow; pop. about 35,000. It has an extensive cannon foundery and manufactory of arms for government, established by Peter the Great in 1717, and upward of 800 private workshops for the manufacture of firearms and cutlery.

TOOMBS, a W. co. of Minnesota, bordering on Dacotah territory, bounded S. by the Mustinka river; area, about 700 sq. m.; pop. in 1860, 40.

TOOMBS, Robert, an American statesman, born in Washington, Wilkes co., Ga., July 2, 1810. He studied 3 years at a college in Georgia, and then went to Union college, Schenectady, N. Y., where he was graduated in 1828. Afterward he studied law at the university of Virginia, and commenced practice in his native place. In 1836 he served under Gen. Scott as captain of volunteers in the Creek war, in 1837 was elected to the state legislature, and with the exception of 1841 continued a member of the lower house until 1845. In that year he was elected to the federal house of representatives, and served in that body until 1853, when he became a member of the U. S. senate, and at the expiration of his first term was reëlected. In both houses he served on various important committees, and was a prominent member of the extreme southern party, and after the election of President Lincoln was one of the most active in persuading Georgia to secede. On Nov. 15, 1860, he made a speech at Milledgeville, Ga., in opposition to Alexander H. Stephens, in which he strongly advocated secession; and on Jan. 7, 1861, he made an impassioned address in the senate in favor of the adoption of that course by the southern states. On Jan. 19 the state of Georgia passed its secession ordinance, and on the 23d Mr. Toombs withdrew from the senate. He was a member of the confederate congress which met at Montgomery, Ala., on Feb. 4. On Feb. 18 Jefferson Davis was inaugurated provisional president of the seceded states, and on the 21st appointed Mr. Toombs his secretary of state. In September of the same year he was succeeded in this office by Robert M. T. Hunter of Virginia. In entering public life Mr. Toombs belonged to the whig party, but about 1850 he went over to the democratic.

TOORKISTAN, or Turkestan, an extensive region of central Asia, so called from its being the original seat of the Turks or Toorkomans, in the wider sense of the appellation, and sometimes called Tartary, from the numerous Tartar tribes which roam over it. The name is usually restricted to the territory lying between Mongolia and the Caspian sea, and having Siberia on the N., and Persia, Cabool, the Punjaub, Cashmere, and Thibet on the S. It is divided into two distinct countries by the Bolor Tagh, the western comprising several independent khanats, and known as Independent Toorkistan, the eastern nominally subject to China, and usually called Chinese Toorkistan. —Independent Toorkistan is bounded N. by the Russian Kirgheez territory and Russian Soongaria, E. by Chinese Toorkistan and Cashmere, S. by the Punjaub, Cabool, and Persia, and W. by the Caspian sea. Its area is somewhat vaguely estimated at 770,000 sq. m., and its population at 6,000,000. It is divided into a number of independent and often hostile khanats, of which the principal are Kafiristan in the S. E., Koondooz and Budukhshan in the E., Khokan in the N. E., Bokhara and Khiva in the central portion, and Toorkomania, or the south-western Kirgheez steppe, along the shores of the Caspian sea, in the W. Bokhara is the largest town, and is usually regarded as the capital of the country, though possessing no control over the remoter khanats. The other towns of importance are Khokan, Khojend, and Tashkend in Khokan; Khuloom and Koondooz in Koondooz; Khiva, Koongrad, and Shurookhs in Khiva; Samarcand, Karshee, and Uratepeh in Bokhara; and Kaundaish and Tchitral in Kafiristan. The principal rivers are the Jihoon or Amoo-Daria (the ancient Oxus), which bisects the country, and discharges its waters into the sea of Aral; the Sir-Daria (Jaxartes), which with its numerous affluents drains the northern plain and enters the sea of Aral near its N. extremity in Siberia; the Zerafshan or Zirjafshan, which, rising in the great plain of Pamir, flows W. through the centre of the country and falls into a small salt lake S. S. W. of Bokhara. Beside these there are numerous tributaries of the Jihoon, some of them rising in the Bolor Tagh and others in the Hindoo Koosh, which are themselves important rivers; among these are the Duwan or Pjandje, the Sharood, the Akserai and its branches the Soorshab and Farkan. The Caspian sea bounds the country on the W., and the sea of Aral at the N. is partly within its limits. There are also numerous small lakes, all of them salt, of which the Siri Kol, said to be the most elevated lake in the world, the Riang Kol, the Dsarik Kol, and the Kara Kol are the most important. Between the 39th and 41st parallels the continuation of the Thian-shan or Celestial mountains (which here cross the Bolor Tagh) extends in two parallel ranges to near the meridian of 66° E., called Aktan-Isfera and Tanglakyar; the two ranges are separated by the valley of the Zerafshan, and form the northern and southern watersheds of the country. N. there is a gentle slope from the Aktan-Isfera to the shores of the Aral, which is about 84 feet below the surface of the Black sea; and S. from the Tanglakyar there is a gradual descent to the broad valley of the Jihoon. In the S. E., where the Bolor Tagh unites with the Hindoo Koosh, the lofty plain of Pamir, said to be 15,600 feet in height on the shores of the Siri Kol, falls rapidly to the valley of the Oxus, near Koondooz. The valleys of the rivers are fertile, but the more elevated lands are exceedingly sterile. The northern plain is believed by geographers to have formed at some remote period a part of the bed of the ocean. In the upper valley of the Jihoon the productions of the temperate zone are mingled with those of a semi-tropical character. The Bolor Tagh and its western prolongations protect it from the cold winds of the N. and N. E., and the Hindoo Koosh from the hot blasts from the S. E. The climate is greatly diversified; on the northern plain the summer heats are intense, and the cold of winter equally so, while the spring and autumn are characterized by heavy rains and sudden transitions. In Bokhara the climate is pleasant, dry, and salubrious, but cold in winter, the Jihoon being frozen so that teams can pass over it. Snow lies about 3 months; there are frequent tornadoes. The soil in the valley of the upper Jihoon gives indications of a volcanic character, and the climate is influenced by subterranean heat. The geological formations of the country are in the mountainous districts secondary, on the plains for the most part tertiary and alluvial. Gold has been found from time immemorial in the sands of the Jihoon; salt deposits are numerous; sal ammoniac occurs in its native state; and rubies, lapis lazuli, and other precious stones occur. The vast plains are almost entirely without forests, and the number of indigenous plants is small. Fruits are excellent and abundant; the melons of Bokhara are unrivalled. Rice, wheat, millet, rye, barley, maize, tobacco, hemp, and rhubarb are cultivated in the valleys. In the valley of the Jihoon silk is largely produced. On the Toorkomanian steppe hardly any thing will grow except on the banks of the rivers. The number of animals is not great. There are several species of rodents, of which the mouse is the most abundant. In the valley of the Jihoon the buffalo, wild horse, one or two species of antelope, the yak, argali, leopard, wolf, fox, and hare are found; in the sterile plains are bats, tortoises, and lizards; scorpions are common, and the plague of locusts sometimes destroys the crops. There are no singing birds, but plovers, wild pigeons, and water fowl are abundant. There are but few fish; a species of dogfish called *lukha*, without scales, is found in the Jihoon, and attains sometimes the weight of 600 lbs.—The inhabitants of Independent Toorkistan are of several different races. The larger portion of them are Toorkomans proper, or Usbecks, as they are frequently called, and this region has been for many centuries their home. On the Toorkomanian steppe and in some of the other khanats there are considerable numbers of Kirgheez and some Nogai Tartars. In Kafiristan (Turkish, "land of the infidel") the inhabitants are of pure Caucasian race, and call themselves "brothers of the Firinghees" or Europeans; their language is Medo-Persian. The Taujiks, or Tadjiks, who are numerous in the towns, are thought to be of Persian or Arabic origin, and speak pure Persian. There are also some Jews. The prevailing religion is Mohammedanism, and the greater part of the tribes are Sheeahs; according to Dr. Wolff, however, there are one or two tribes of Soonnees, and some Soofees or mystics. The Kafirs and some of the Tartars are not Mohammedans, but worshippers of the Dalai lama. The Toorkomans are a fierce, haughty people, given to deeds of rapine and plunder, irascible and violent, but usually truthful and hospitable. They are generally hostile to foreigners. The people of the towns are less bold and daring, but more crafty and deceitful. Few travellers have visited the country, and of these few the greater part have paid for their temerity with their lives. Stoddart, Conolly, Moorcroft, Guthrie, and A. Schlagintweit thus perished.—The commerce of the country, especially of the towns of Bokhara and Khiva, is considerable, and is conducted entirely by means of caravans. Native productions form but a small part of this commerce; but these towns are the convenient entrepots of the products of Russia, Persia, Afghanistan, India, and the Chinese empire, which these nations exchange with each other, and hence enjoy a large carrying trade. Bokhara alone employs 3,000 camels in this trade. The manufactures of the country consist chiefly of some silk and cotton stuffs, sabres, knives, and other weapons. The exports are cotton, mostly from China, wool from Thibet, fruits, hides, sheepskins, and silk. The imports are muslins, brocades, sugar, shawls, and white cloths from India; European manufactured goods from Russia; porcelain, musk, tea, rhubarb, and cotton from China; and wool from Thibet. The government is despotic, but the khans are controlled by the Koran and by the influence of the priests.—CHINESE TOORKISTAN is bounded by the Siberian province of Tomsk, Mongolia, Thibet, Cashmere, Independent Toorkistan, and Russian Soongaria. Its area is variously estimated at from 500,000 to 800,000 sq. m., and its population at from 1,000,000 to 3,000,000. It is divided into two provinces by the Chinese, the one N. of the Thian-shan or Celestial mountains, which pass through its centre from E. to W., being called Thian-shan-pe-lu or Soongaria (see SOONGARIA), and the division S. of those mountains Thian-shan-nan-lu. Its principal towns are Yarkand, the capital, Ili or Guldja, Kashgar, and Aksu. The country on three of its sides is bordered by lofty mountain ranges; the Kuen-lun mountains form its southern boundary, the Altai bounds it on the N., and the Bolor Tagh separates it from Independent Toorkistan. On the E. the great central desert of Asia, Gobi, divides it from the inhabited portions of China and Mongolia. Thus walled in by mountains and desert, it is a country so little accessible that it is almost as much an unknown region to European travellers as central Africa. The southern province, or Chinese Toorkistan proper, is an elevated plain drained by the Tarim and its 6 great tributaries, the Kashgar, Yarkand, Kurakool or Karakash, Khotan, Yarungkash, and Kena, all entering it from the S., and 3 or 4 of less size from the N. This great and remarkable river, over 1,500 miles in length, rises in the Kuen-lun and Bolor Tagh mountains, several of its affluents having their source in small lakes in those mountains, and, draining the entire province, discharges its waters into two small lakes, Lop-nor and Bostengnor, in the W. part of the great desert. The whole of this province, as well as the desert, forms a deep basin without outlet, the streams all running toward the centre, which is estimated to be about 1,280 feet above the level of the sea, and toward which the plateau slopes in every direction from the mountain crests, which are 15,000 to 16,000 feet in height. There are several small lakes. The Thian-shan chain is about 1,400 m. in length, nearly 100 in breadth, and rises for most of its length above the line of perpetual snow. Nearly ¾ of the surface is said to be unfit for cultivation, but in the valleys of the rivers there are fertile lands, on which, under the intense heats of summer, many of the semi-tropical fruits and vegetables ripen. Considerable silk is raised, of good quality, and cotton, rice, wheat, millet, and leguminous plants, sesamum, hemp, and flax are cultivated extensively wherever the soil will permit. Grapes, pomegranates, melons, and other fruits are of excellent quality and in great abundance. The herds of cattle are very large, and afford the principal article of export. The wild animals are generally the same with those of Independent Toorkistan, but the argali is more plentiful. The two-humped or Bactrian camel is a native of the Thian-shan mountains. The minerals are gold, found in the mountain streams and in the Thian-shan mountains, iron, copper, nitre, sal ammoniac, sulphur, asbestus, agate, and the precious jasper, which is a monopoly of the Chinese empire. The inhabitants are mainly Toorkomans of the Usbeck tribe, who are said to be superior in character and intelligence to those of Independent Toorkistan. There are also in the towns Persians, Cashmerians, Mantchoos, Tunguses, and some Jews and Hindoos. Mohammedanism is the prevailing religion, but there is a clan of Usbecks on the Lop-nor who are not Mohammedans. The Mantchoos are generally worshippers of the Dalai lama. The Chinese authorities as well as the local hakim-beys forbid any Europeans to enter the country. The commerce of the southern province is extensive, its caravans trading with Pekin, Lassa, Nijni Novgorod, and many intermediate points. Although the country nominally belongs to China, the Usbecks allow the Chinese only a moderate share in the general government, and do not permit them to interfere in their internal affairs or their religion.—Independent Toorkistan was known by the name of Turania to the ancient writers on Persia. It was the theatre of repeated terrible conflicts between the Iranian or Persian and the Turanian races, in the early ages of Persian history, and the Persian hero Jamshid figures as largely in some of these as Achilles in those of the early Greeks. The Iranians finally remained masters of the southern part of the country, and at the beginning of the historic period it was comprised in the Persian satrapies of Bactria and Sogdiana, which were afterward conquered successively by Alexander the Great, the Greek kings of Bactria, the Parthians, the later Persians, the Arabs, and the Tartars or Mongols of Genghis Khan and Tamerlane, under whom the Turkish and Tartar elements almost entirely replaced the Indo-European. The Tartars ruled over the southern portion till 1494, when their sultan Baber, driven out by the Turkish tribe of the Usbecks, emigrated to Hindostan, and there founded the Mogul empire. The Usbecks established a powerful monarchy, which continued about 160 years, but in 1658 separated into numerous independent khanats, in which condition it has since remained. Russia has recently acquired a strong foothold in western Toorkistan, and especially in Khiva, into which khanat an army of 17,000 Russians penetrated in 1854, and imposed upon the khan a treaty of alliance, by virtue of which a Russian ambassador resides at Khiva; 10,000 Khivan cavalry are placed under Russian officers, and paid by the Russian government; the Russians are authorized to maintain a garrison at Urgbendj, and a Russian fleet is stationed in the Aral, and ascends the Jihoon at pleasure. The N. W. portion of the country, W. of the Aral, and forming a part of the Kirgheez steppe, is considered by the Russians as really a part of their empire, and they have erected 16 fortresses on the steppe to control it. Chinese Toorkistan has been from time immemorial divided into petty sovereignties, ruled by *khodjas*, or seigniors, and in the lower province its history consists only of a succession of squabbles between the chiefs of these, or the subjection of a part or the whole to the sway of some more powerful monarch from without. Of these conquests by foreign powers, the first of note was that effected by the Mongols under Genghis Khan. In 1758 the Mantchoo Tartars, then as now masters of China, subdued the province and divided it into 10 principalities, which they annexed to the Chinese empire. An attempt was made by the inhabitants in 1825 to throw off the Chinese yoke, but it was not successful. (See SOONGARIA.)

TOPAZ, a precious stone consisting of the following ingredients in 100 parts: silica, 34 to 39; alumina, 48 to 58; fluorine, 15 to 18.5. It is represented by the formula $3Al_2O_3, 2Si[O, Fl]_5$. Its specific gravity is 3.4 to 3.65, and its hardness 8, or between that of quartz and sapphire. It is generally yellow or colorless, but sometimes green, blue, or red. The yellow Brazilian topaz when heated becomes reddish, while the Saxon wine-colored topaz loses its color entirely. It crystallizes in the trimetric or rhombic system, the prisms generally having dissimilar extremities. When heated in the blowpipe flame it becomes covered with small blisters, while a coarse variety called physalite (Gr. φυσαω, to blow) swells up when heated. Several kinds of minute crystals of other minerals and two or three fluids were discovered by Sir David Brewster in the cavities of topaz. Like amber, it is very easily rendered electric by heat, &c., and retains the electricity for a long time. Its principal localities are the Ural and Altai mountains, Miask in Siberia, Kamtchatka, Villa Rica in Brazil, Cairngorm in Aberdeenshire, the Mourne mountains in Ireland, and Saxony; and in the United States, at Trumbull and Middletown, Conn., and at Crowder's mountain, N. C. Physalite occurs in Norway and Sweden in very large crystals, one of 80 lbs. having been found. The topaz is not very highly valued as a gem, though very fine specimens sometimes bring good prices. Tavernier speaks of one weighing 157 carats or about 625 grains, belonging to the

Great Mogul, which cost 181,000 rupees. The principal supply is from Brazil, which furnishes about 40 lbs. annually. The white and rose-red are the most valuable. The former are called by the Portuguese *pingos d'agoa* (drops of water), and when cut closely resemble the diamond in lustre and brilliancy. The name oriental topaz is sometimes given to yellow sapphire (see Sapphire), and a yellow variety of quartz is sometimes known as false topaz; but the first is much harder and the second softer than the real stone, while neither can be readily electrified by heat, like the topaz.

TOPHET, a spot in a fertile valley S. E. of ancient Jerusalem, called the valley (*Ge*) of Hinnom, or of the children of Hinnom, and hence Gehenna in the New Testament, and watered by the brook Kedron. It obtained an infamous reputation from being the place where the idolatrous Jews passed their children through the fire to Moloch, the god of the Ammonites; and according to a common derivation, the word comes from the Hebrew *toph*, a drum, because it had been customary to drown the cries of the victims by the noise of drums. At a later period it was used as a spot to throw the garbage of the streets, the carcasses of beasts, and the dead bodies of men to whom burial had been refused; and as a fire was kept constantly burning to consume all that was brought, the word was used metaphorically for hell. Some writers, therefore, identify the word Tophet with *tophteh*, which designates a burning or burial place.

TOPLADY, Augustus Montague, an English clergyman, born at Farnham, Surrey, Nov. 4, 1740, died in London, Aug. 11, 1778. He was educated at Westminster school and Trinity college, Dublin, entered holy orders, and obtained the living of Broad Hembury in Devonshire, where he resided for some years, but in consequence of ill health removed to London and preached in a chapel in Leicester square. He was a noted popular preacher, but his fame rests principally upon his controversial writings against the Methodists. He was the great champion of Calvinism in the church of England, and his works (6 vols. 8vo.) are almost exclusively devoted to the defence of the doctrines of Calvin, and are remarkable alike for logical clearness and rhetorical energy. He also edited for several years the "Gospel Magazine."

TÖPLITZ, or Teplitz, a town near the N. W. frontier of Bohemia, in a valley of the Erzgebirge, celebrated for its thermal springs; permanent population about 4,000. There are 17 springs, varying in temperature from 118° to 119° F., considered very efficacious for gout, rheumatism, and kindred maladies. It contains a great number of houses for the accommodation of visitors, who in the season often reach 10,000. There are 3 classes of baths, some free to the public, others for the higher classes, and the third reserved for the use of the wealthy nobility and royalty. The palace of Prince Clary with its beautiful surrounding grounds, containing a theatre and a large hall variously used as a dining, reading, and ball room, is open to the public. There are several hospitals, of which two are military, one Austrian and the other Prussian. The treaty of alliance between Russia, Prussia, and Austria, preceding the battle of Leipsic, was concluded at Töplitz in Sept. 1813.

TOREÑO, José Maria Queypo de Llano Ruiz de Savavia, count of, a Spanish statesman and historian, born in Oviedo, Nov. 26, 1786, died in Paris, Sept. 16, 1843. In the rising of the Spaniards against the French in 1808 he took a strong interest, and was sent to England to negotiate for the assistance of that country. He became afterward, in spite of his youth, a prominent member of the cortes, but on the return of Ferdinand VII. was obliged to go into exile, residing successively in Portugal, England, and France. The revolution of 1820 recalled him to Spain, and until 1823 he occupied a conspicuous position in the cortes. The triumph of the absolutists caused him, however, to be banished a second time, and from this exile he did not return until the publication of the amnesty of 1832. In 1834 he entered the cabinet as minister of finance, and after the resignation of Martinez de la Rosa in 1835 he succeeded him as minister of foreign affairs and president of the council; but his growing unpopularity and the intrigues of Mendizabal forced him in September of that year to resign. On the breaking out of the revolution of La Granja in Aug. 1836, followed by the proclamation of the constitution of 1812, he retired to Paris, but after a few months was permitted to return to Spain, from which the revolution of Barcelona again drove him, and during this exile he died. In 1827 he began at Paris a history of the Spanish war of independence, which is the great Spanish work on that subject; it is entitled *Historia del levantamiento, guerra y revolucion de España* (5 vols., Madrid, 1835-'7; best ed., 4 vols. 8vo., 1848).

TORFÆUS, or Tormodus, the Latin name of an Icelandic scholar, whose real name was Thormond Thorveson, born in Engve in 1640, died in 1719. He received a liberal education, and Frederic III. of Denmark in 1660 made him interpreter of Icelandic manuscripts, and in 1662 sent him to Iceland to collect manuscripts, in which he was eminently successful. In 1667 he was appointed keeper of the royal collection of antiquities, but in consequence of killing a man in self-defence was obliged to give up the post. In 1682 he was appointed royal historiographer, and held this position until his death. He wrote numerous works, some of which still remain in manuscript. One of the most important is his *Historia Rerum Norvegicarum* (4 vols. folio, Hafniæ, 1711). He first published the northern sagas respecting the discovery of America.

TORGAU, a fortified town of Prussia, on the left bank of the Elbe, 70 m. S. S. W. from Berlin, in the administrative district of Merseburg and province of Saxony; pop. about 9,000. There are manufactories of linen and woollen goods and a brass foundery in the town. The tomb of Catharine von Bora, the wife of Luther, is here. In 1525 the Lutherans concluded a league with the elector Frederic the Wise of Saxony at Torgau. In 1530 they settled there some articles which served as the basis of the Confession of Augsburg, and in 1576 published a confession of faith called the "Book of Torgau." In 1760 Frederic the Great defeated the Austrians near this town. Being held by the French during the campaign of 1813, it was besieged by an army under Tauentzien toward the close of that year, and capitulated in December. The siege was marked by an unparalleled destruction of life from typhus fever among the garrison and in the vast hospitals.

TORGET, a small island of Norway, off the S. W. coast of Nordland, lat. 65° 30′ N. It is noticeable only for the mountain of Torghatten, which rises almost perpendicularly from the water to a height of over 2,000 feet, having on its summit a small lake, and being completely perforated near its centre by an immense cavern 6,000 feet long and 600 feet high. The mountain is cleft in many places almost to its base, apparently by earthquakes. The Norwegians have a tradition that their ancient kings were accustomed when crowned to visit this cavern, and prove their strength by hurling a javelin through it.

TORLONIA, the name of a family of Italian bankers raised to the rank of Roman princes. GIOVANNI TORLONIA, who died at Rome Feb. 25, 1829, as duke of Bracciano, by extensive enterprises and successful investments, laid the foundations of the fortunes of his family. His eldest son, MARINO, born in Rome, Sept. 6, 1796, inherited the duchy of Bracciano, which however was sold to the Odescalchi family. The second son, CARLO, born Dec. 18, 1798, was commander of the order of the knights of St. John, and became a partner in business with the youngest brother, ALESSANDRO, born June 1, 1800. The last named, who bears the titles of prince of Civitella-Cesi, duke of Cesi, and marquis of Roma-Vecchia, has increased to an enormous amount the property left by the father. He has devoted his wealth in large measure to constructing magnificent buildings, collecting works of art, and carrying on new and useful enterprises in Rome and its neighborhood.

TORNADO. See HURRICANE.

TORNEA, a river of northern Europe, having its source in the lake of Tornea-Trask, in the province of Pitea, Sweden. Its course is at first S. E. to the Russian line, thence S., forming the boundary between Russia and Sweden, and finally falling into the gulf of Bothnia after a course of about 240 m. Its principal affluents are the Lanio and Muonio, both from the left. It runs between high banks, and has a very rapid current for most of its course, but below Carl Gustav is somewhat wider. It forms the fine cataract of Julhae between Vojakkab and Kukkola.

TORNEA, a town of European Russia, in the district of Uleaborg, Finland, capital of the circle of Tornea, situated on the left bank of the Tornea river, near its mouth, in the gulf of Bothnia; lat. 65° 50′ 8″ N., long. 24° 14′ E.; pop. 800. It has a considerable trade in timber, salmon and other fish, feathers, reindeer skins, butter, tar, furs, tobacco, and spirits. The town was founded in 1620 by the Swedes, and captured in 1715 and 1809 by the Russians, who finally held it by the treaty of Frederikshamn. The boundary between Russia and Sweden was definitively settled by a treaty made here in 1810. The observations of Maupertuis and the other French academicians for determining the figure of the earth were made at Tornea in 1736–'7. After the middle of June the place is frequently visited by travellers who come to witness from the summit of a neighboring mountain the spectacle of the sun remaining for a number of nights above the horizon.

TORONTO (formerly YORK), a city of the British province of Canada, formerly the seat of the provincial government, and still the capital of Upper Canada. It is situated in York co., on a well protected bay of Lake Ontario, 40 m. from the W. extremity of the lake, 30 m. by a direct line N. of Fort Niagara on the opposite shore, 360 m. W. S. W. from Montreal, 165 m. W. S. W. from Kingston, and 45 m. N. by E. from Hamilton; lat. 43° 34′ N., long. 79° 20′ W.; pop. in 1861, 48,821, of whom 18,767 were natives of the province, 12,441 of Ireland, 7,112 of England, 2,961 of Scotland, 2,031 of the United States, and 807 of other countries. The city is regularly laid out on a plateau which extends backward from the lake a distance of 3 m. to a ridge of high ground, forming the N. boundary of the town and the connecting village of Yorkville. The present corporation limits include an area of 3,000 acres. The chief business thoroughfares are King street, running E. and W. parallel with the lake, from 100 to 200 yards N. of the bay; Yonge street, running at right angles with King street, and by its extension in a direct line N. constituting the old line of communication with Lake Simcoe, 35 m. distant; and Queen street, occupying part of the old Dundas road, so called after the governor of that name, and which formed the great line of communication between the East and the West before the days of railroads. Spadina avenue, St. George's square, and Jarvis, Gerard, and Church streets are in part built up with large and elegant private dwellings. Toronto is distinguished for the number and costliness of its places of public worship, numbering in all 27, exclusive of various religious meeting houses which do not claim the designation of churches. The principal ecclesiastical edifices are St. James's, the cathedral church of the Anglican communion, a fine Gothic structure, erected in

1852 at an expense of $180,000; Knox's church, belonging to the Free Presbyterian body, remarkable for the symmetrical proportions of its spire; Cooke's church, a large edifice, belonging to the same body; Gould street chapel, formerly belonging to the United Presbyterians; the Richmond street Wesleyan Methodist church; Zion chapel, Congregational; St. Michael's cathedral, Roman Catholic; and the Unitarian chapel in Jarvis street. The religious division of the city in 1861 showed the following proportions: church of England, 14,125; Roman Catholics, 12,135; established Scotch church (Presbyterian), 2,893; Free church (Presbyterian), 2,480; United Presbyterians, 1,231; Wesleyan Methodists, 5,022; Episcopal Methodists, 1,149; New Connexion Methodists, 280; other Methodists, 525; Baptists, 1,288; Congregationalists, 826; other bodies, 3,113. Toronto is a bishop's see of both the English Episcopal and Roman Catholic churches. The benevolent institutions are numerous and well sustained both by public endowments and private subscription. They include among others the general hospital, which had originally an endowment of public lands, and receives beside a yearly grant from the provincial parliament; the lunatic asylum, supported by a special tax, and affording accommodation to 300 patients; a house of industry, dependent in part on municipal support; the house of providence, supported by the Catholics; the house of the sisters of mercy; and the Protestant orphan asylum, dependent also on private benevolence. The educational institutions embrace the educational department for Upper Canada, occupying in conjunction with the normal and model schools a handsome building and ample grounds in the centre of the city; the Toronto university and University college, for the use of which a building, the most elaborate and conspicuous in the province, was provided in 1859 at a cost of $420,000; and the Upper Canada college, an imitation in a modified form of Harrow and Rugby schools in England, intended as a preparatory school for the University college. Beside these, there is a grammar school supported by a public grant and the fees of students; 8 ward common schools, established on the free principle, and maintained at an average cost for the last 5 years of $21,300; and 4 separate schools belonging to the Roman Catholics, which share in the public educational grant in proportion to the numbers attending. Of the denominational collegiate institutions there are several which have a high provincial standing. Among these are: Trinity college, belonging to the church of England; St. Michael's college, Roman Catholic; and Knox's college, the theological institution of the Free church Presbyterians. There are 2 daily and 5 weekly newspapers, beside several scientific and theological magazines. The banks properly belonging to the city are the bank of Upper Canada and the Toronto bank; beside these, there are branches of the bank of Montreal, City bank, Ontario bank, bank of British North America, the Quebec bank, and the Banque du Peuple. In addition to the public buildings already noticed, there are the mechanics' institute, the St. Lawrence hall and market, the court house for the county and city, the crystal palace (an agricultural exhibition building), and the old parliament house. Surpassing these, however, in the elaborateness and beauty of the design, is Osgoode hall, the temple of the law for the whole of the western province. In this building the sittings of the chief courts of the province are held, including the queen's bench, the common pleas, the court of chancery, and the court of error and appeal. The benchers of the law society have their headquarters here; and out of the funds belonging to this corporation, and by means of an additional government grant, the hall in its present costly shape was erected.—The city is municipally divided into 7 wards, each of which returns annually to the common council two aldermen and two councilmen, making the whole number 28. The mayor is also elected annually. The two classes of municipal representatives sit and deliberate in one chamber; but the powers of the councilmen are not magisterial, like those of the aldermen and the mayor. The principal public improvements effected under municipal control are a thorough system of drainage, extensive water works supplied from the lake, and a large esplanade fronting the bay, partly designed as an open promenade ground, and partly for the use of the railways which concentrate at this point. The cost of the esplanade is estimated at $700,000. The railways which connect Toronto with other points are: the Grand Trunk, running eastward to Kingston, Montreal, Portland, and Quebec, and westward direct to Sarnia, Port Huron, and Detroit, and by branch to London; the Great Western, connecting the city with Hamilton, London, Detroit, and Niagara; and the Northern, running to Collingwood on Lake Huron, and thence connecting by steamboats with Chicago and the great grain depots of the West.—The principal manufactures consist of cabinet ware, iron rails, for which a factory was established in 1859, and various founderies, distilleries, and flouring mills. For the establishment of a cotton mill a corporation grant of land was made in 1860; the progress of this undertaking, however, was arrested by the difficulties which the civil war in the United States (1861–'2) threw in the way of the procurement of cotton. The average value of property, real and personal, from 1855 to 1861, was $23,172,800. The direct shipping trade of the port includes imports of coal from Lake Erie ports, *via* the Welland canal; of general merchandise from Lewiston by the Niagara river and from Rochester by the lake; and of heavy goods, chiefly hardware and groceries, from Montreal. The exports are chiefly of manufactured lumber and flour, and of wheat and other grain to Oswego, Ogdensburg, and Montreal. The imports from 1855 to 1861 averaged annually $4,157,182, and the exports $1,605,652.—Toronto has only been known by that name since 1834, when it was incorporated as a city. In 1791, when a parliamentary constitution was first given to the province of Upper Canada, the capital was placed by royal proclamation at Niagara Point, near the mouth of the river of that name; and at that time the site of the city of Toronto was occupied by a few families of Mississauga Indians. In 1794 the place was selected by Governor Simcoe as the site of a town, and early in the present century it was selected as the seat of government in place of Niagara. Its distance from the frontier by the land route was its chief military recommendation; for it has no natural defences, and was easily reduced by the invading American force in the war of 1812-'14. On economic grounds, its central position made it eligible as the seat of the executive and the chief courts of law. But it was probably even still more recommended by the commercial advantages of a natural harbor, which is formed with but little artificial improvement by the deposits of a sluggish stream entering the lake on the eastern boundary of the city, and on which the lake sands have accumulated, until a peninsula has been formed, extending in a curving line S. and W. for a distance of 3 m., and thus creating a fine basin of smooth water for the protection of shipping. So late as 1817 the population of the town of York was only 1,200, and in 1826 it was but 1,677. Two years after its incorporation as a city its population had increased to 9,652. It suffered seriously by the insurrection of 1837, being the head-quarters of the rebellion, and also by the removal of the seat of government to Kingston, after the union of the provinces in 1841. In 1849 the seat of government was temporarily restored, and again in 1855; and its progress from the first named period, 13 years ago, although decided, has been necessarily fluctuating, on account of the changes incident to the alternating system of locating the seat of government for the united province.

TORPEDO, the popular name of the electric rays or skates of the family *torpedinidæ*. They were called *ναρκη* by the Greeks and *torpedo* by the Latins; the Germans call them *Krampf-Fisch*, the French *torpille*, and the English cramp fish and numb fish. The body is smooth and rounded; the tail short and thick, cylindrical at the end and keeled on the sides; teeth conical, sharp, and crowded; ventral fins immediately behind the pectorals, dorsals generally 2 and on the tail, and the caudal subtriangular. The electrical apparatus, which has given the name to the family, is arranged in 2 masses, one on each side of the skull, between this and the base of the pectorals; it is composed of a multitude of perpendicular gelatinous columns or hexagonal prisms, separated by membranous partitions containing a fluid, freely supplied with blood, and receiving very numerous nervous filaments from the par vagum and trifacial nerves. There are about 20 species, arranged in 7 genera, in the seas of all parts of the world; the best known are the species of the Mediterranean and the W. coast of Europe, and of the Atlantic coast of North America, all belonging to the genus *torpedo* (Dum.), in which the mouth is crescentic, the teeth not extending outward beyond the margin of the lips, and spout-holes distant from the eyes, with a circular fringe around the opening. The common torpedo of the Mediterranean (*T. marmorata*, Rud.; *T. Galvanii*, Bonap.) is sometimes of a uniform brown color, but generally marbled or spotted with darker; it rarely attains greater dimensions than 4 by 2½ feet, or a weight over 50 lbs. The spotted torpedo of the same sea (*T. ocellata*, Rud.; *T. narke*, Risso) is of a yellowish red color, with 1 to 5 large, rounded, grayish blue spots, surrounded by a brownish circle, with a few whitish dots, and grayish white below. One (or both) of these species occurs on the W. coast of Europe as far as Great Britain, and also, it is said, in the Persian gulf and Indian ocean; they feed on small fish, keeping on the mud or sand at the bottom; their flesh is eaten along the Mediterranean. Their electrical powers were well known to the ancients, and their shock was recommended by them for the removal of various pains, especially of the head—the earliest example of the application of electricity as a remedial agent. The use of this battery is probably both for defence and for the purpose of obtaining food, their motions being very slow; Mr. Couch is of opinion that animals killed by it, as by lightning, decompose more quickly and are more easily digested than they otherwise would be, such a preparation of the food being perhaps necessary in an animal with an intestinal canal shorter than the stomach; the shock is said to be less powerful than that of the electrical eel, though it may be felt through a line, pole, or even stream of water. This apparatus is analogous to the galvanic pile, and its anatomy has been investigated by John Hunter ("Philosophical Transactions," 1773), who counted 1,200 columns in a very large fish, about 150 plates to the inch; the ends of the prisms are in contact with the skin above and below, and each cell of the vertical series is lined with an epithelium of nucleated corpuscles.—The American torpedo (*T. occidentalis*, Storer) attains a length of about 4½ feet and a width of 3; it is dark brown above with a few black dots, and white beneath; eyes very small, and spout-holes directed outward and a little forward. It is found on the coast of Massachusetts about Provincetown in the autumn, and at Chilmark, near Gay Head, in the spring; many run ashore on the sandy beaches, and some are occasionally taken by seine, hook, and harpoon; the liver contains an excellent burning oil, 1 to 2 gallons from a common-sized fish; it is also used externally and internally for cramp. In a dissection given in the "Proceedings of the Boston Society of Natural History" (vol. v. p. 21, 1854), Prof. J. Wyman estimated the number of plates at between 250,000 and 300,000, about 1,200 prisms in each battery, each 1 to 2 inches in height, and containing about 100 plates to the inch; the interval between the plates was filled with an albuminous fluid, 90 per cent. water, containing common salt in solution; the ganglia from which the par vagum nerves arise are larger than the brain itself, indicating the great nervous power supplied to the battery.—For details on this subject see ELECTRIC FISHES, and *Leçons sur les phénomènes physiques des corps vivants*, by C. Matteucci (Paris, 1847).

TORPEDO, in military science, a machine for blowing up ships, invented by Mr. David Bushnell of Connecticut in 1776, and named by him the torpedo, or "American turtle," from the resemblance in the form of a portion of the original one he made to two upper tortoise shells. These shells were placed together, and were sufficiently capacious to contain the operator and air enough to support him half an hour. The portion occupied by him was a close pipe in the part corresponding to the head of the animal, and in this he was seated upright in a position to use an oar for propelling the machine through the water. In the other end was placed a quantity of lead for ballast to keep the machine upright, and an aperture was there made, controlled by a valve for admitting water, so as to descend when desirable; and two brass forcing pumps furnished the means of ejecting this water, when it was necessary to ascend. To the after part of the machine was attached a powder magazine, hollowed out of oak timber, large enough to contain 150 lbs. of powder, together with the apparatus used for firing it. A screw belonging to it, managed by the operator, was used to secure it to the vessel which it was intended to destroy. A gun lock connected with clockwork was contained in the magazine, and the latter was set in action on casting this off; and according to the time the clockwork was set to run, the fire was struck by the gun lock. An attempt was made with this apparatus to destroy the Eagle, a 64-gun ship, commanded by Lord Howe, lying in New York harbor, which failed from the operator striking as he supposed a bar of iron in the bottom of the ship, which prevented the entrance of the screw; and as daylight appeared before he could return to shore, he cast off the powder magazine near Governor's island, which in one hour's time exploded, throwing up a vast column of water, to the great alarm of those on board the ship, who were entirely ignorant of the cause. Mr. Bushnell made several other attempts in 1777 to destroy English shipping by this method; and in one of these against the frigate Cerberus, lying at anchor near New London, Conn., his machine, which in this case was attached to a rope with a view of its drifting against the frigate, was drawn on board a schooner near by, and on exploding blew this vessel to pieces. Another device of Mr. Bushnell was to charge a large number of kegs with powder, and an apparatus so arranged as to cause this to explode whenever the kegs, set adrift above the shipping, came in contact with other objects. Some of these, floating down the Delaware in Dec. 1777, exploded among the ice, and one blew up a boat; and altogether they occasioned the greatest consternation among the British seamen at Philadelphia, who manned the wharfs and shipping, and discharged small arms and cannon at every thing floating down with the ebb tide. This is known as the "battle of the kegs."—Torpedoes upon a somewhat similar plan were next devised by Robert Fulton in 1805, and their efficiency was exhibited near Walmer castle, then the residence of Mr. Pitt, in the destruction of a strong-built Danish brig of 200 tons, which was submitted to his experiments. In Aug. 1807, he performed a similar experiment in New York harbor. His torpedoes were submerged cases containing gunpowder with the lock and clockwork for exploding. Two cases, one at each end of a line, were dropped ahead of a ship at anchor, so as to be caught across her hawser by the middle of the line, thus letting each case swing against a side of the ship. (See FULTON.) Fulton published an illustrated treatise on torpedoes, entitled "Torpedo War and Submarine Explosions" (New York, 1810).—In the Crimean war the Russians employed torpedoes of an ingenious construction, which were anchored in the channels leading to Cronstadt. These were magazines held at a certain depth from floating buoys, to which they were attached by a rope. A flexible lead pipe closed at the upper end reached up to the buoy from the magazine, containing a small glass tube holding sulphuric acid, which would cause an explosion on coming in contact with the preparation of chlorate of potash, &c., occupying the lower portion of the lead tube and connected with the gunpowder in the magazine. The concussion caused by a vessel striking the buoy would break the glass tube and thus produce the explosion. —Torpedoes have been resorted to as a means of preventing the passage of U. S. vessels through southern waters, during the civil war of 1861-'2. At Columbus, Ky., as many as 4 varieties of these machines were found, 3 of which were intended for use under water, and a fourth for exploding under ground. They were of formidable dimensions, some made of cast iron and some of boiler plate iron, some designed to explode on being struck by a heavy body, and others to be fired by galvanic batteries contained in subterranean apartments. Notwithstanding the great labor and ingenuity expended on torpedoes, they have proved of no service in warfare; and their success is dependent upon so many contingencies that the probabilities are very small of their taking a place among the established weapons of war.—TORPEDOES, in pyrotechny, are explosive preparations made of various compounds, such as are described in the article Fulminates.

TORQUATUS, Titus Manlius Imperiosus, a favorite hero of Roman story, who flourished during the last half of the 4th century B. C. In his youth he is said to have been of dull intellect, and brought up in great privacy in the country; upon which account in 362 the tribune M. Pomponius, in an accusation against the elder Manlius, hated by the people for his haughtiness, charged him also with being an arbitrary and tyrannical parent. As soon as the young Manlius heard of this, he hastened to Rome, and compelled Pomponius to withdraw his accusation; and this act of filial devotion so pleased the Romans that he was made the same year military tribune. In the last invasion of the Gauls, he gained great distinction by fighting with a gigantic enemy on the bridge over the Anio upon the Salarian road. Successful in the combat, he took from the neck of his slain opponent the chain of gold (*torques*) and put it around his own, and from this circumstance was called Torquatus by the soldiers, a name which was handed down to his posterity. In 353, though he had not yet held the consulship, he was made dictator in order to carry on the war against the Cærites and Etruscans, and in 349 was again made dictator for the sake of holding the comitia. He was consul in 347, 344, and 340. In this last year his colleague was P. Decius Mus, and the two were appointed to carry on the war against the Latin league. While in the plain of Capua an order was issued forbidding all single encounters with the enemy; but Titus Manlius, the son of Torquatus, having been challenged by Mettius Geminus of Tusculum, fought with his antagonist and slew him. Returning to the camp, he laid the spoils at his father's feet; but Torquatus, turning away from him, assembled the soldiers in the prætorium, and in their presence his son was beheaded. The young men of Rome from that time regarded Torquatus with abhorrence, and the memory of the occurrence was long preserved in the phrase *Manliana imperia*. In this campaign a great victory was gained over the Latins at the foot of Mt. Vesuvius, and Torquatus returned to Rome in triumph. According to the *Fasti*, he was dictator again in 320, but the dates of his life vary in different authors.

TORQUEMADA, Tomas de, a Spanish inquisitor-general, born in Valladolid about 1420, died in 1498. He became a member of the order of the Dominicans and prior of the monastery of the holy cross in Segovia, and in 1483 was made inquisitor-general for Spain by Ferdinand and Isabella, in which position he was confirmed by the pope on Oct. 17. From him the inquisition received its thorough organization. Four tribunals were established at Seville, Cordova, Jaen, and Ciudad Real (later transferred to Toledo), and a code promulgated by which the Spanish inquisition was afterward governed. Jews and Moors were expelled under his control, and he multiplied *autos da fè* to such an extent that Pope Alexander VI. was under the necessity of intervening and giving him 4 colleagues to moderate his zeal.

TORRES VEDRAS, a town of Portugal, 25 m. N. from Lisbon, on the left bank of the Sizando; pop. 3,826. It is partly surrounded by its ancient walls, and an old fortress still remains. In the vicinity are an aqueduct with Gothic arches and the noted convent of Varratojo. It is chiefly remarkable as giving name to the defensive lines erected by Wellington in 1810 on a range of heights in its neighborhood, which took nearly a year for their completion, and which set the army of Masséna at defiance.

TORREY, John, M.D., LL.D., an American botanist and chemist, born in the city of New York in 1798. After taking his medical degree at the college of physicians and surgeons, New York, he devoted his attention exclusively to botany and chemistry. He was one of the earlier members, and at one time the president of the New York lyceum of natural history, to the "Annals" of which he largely contributed, both in the department of botany and that of mineralogy. In 1817, at the request of this society, his earliest publication was prepared, viz., a catalogue of the plants growing within 30 miles of New York (1819), a work still interesting as indicating the changes which have taken place in the flora of this now densely populated region in less than half a century. In 1824 he published the first volume of the "Flora of the Northern United States," and in 1826 his "Compendium" of the same; but before the second volume of the larger work was ready for the press, the natural system of Jussieu had so far superseded the artificial system of Linnæus, that he abandoned the work and suffered his materials to accumulate till 1838, when, assisted by his former pupil, Dr. Asa Gray, he commenced the more extended "Flora of North America." In this work he has proceeded as far as the close of the great order *compositæ*, completing one volume and two thirds of a second; but the pressure of other engagements, and the vast accumulation of new genera and species, brought to light by the exploring expeditions across the continent, have compelled delay in its further prosecution. Meantime Dr. Torrey has prepared the botanical part of the reports of the natural history survey of the state of New York (2 vols. 4to., 1843–'4), and in connection with Dr. Gray has examined and described, in the successive government volumes on the exploring expeditions, a large portion of the new plants, shrubs, and trees collected by those expeditions. During all this period he has also been actively engaged in chemical and mineralogical investigations, and in responsible collegiate duties. In 1824 he was appointed professor of chemistry in the West Point military academy, but resigned that post in 1827 to accept the professorship of chemistry and botany in the college of physicians and surgeons in

New York, which he held until 1854; and on his resignation he was appointed professor emeritus. He was also elected in 1828 professor of chemistry at Nassau Hall, Princeton, N. J., and held that position till 1851. In 1853, when the U. S. assay office was established in New York, he was invited to become its assayer, which office he still holds. He has been for some years a trustee of Columbia college, and has taken an active part in promoting its plans for extending the curriculum of instruction and organizing a post-graduate course. It is in the department of botany that Dr. Torrey's labors have been most important and influential. His first considerable work inaugurated a new era for botanical science in North America, and in all that has been effected for its advancement during the last 40 years he has borne a leading part.

TORRICELLI, Evangelista, an Italian mathematician and philosopher, born at Piancaldoli in Romagna, Oct. 15, 1608, died in Florence in 1647. He received a mathematical education in a Jesuit school at Faenza, which he completed at Rome. Some tracts written by him upon the dialogues of Galileo excited the venerable philosopher's attention, and he invited Torricelli to Florence, who 3 months later, upon his death, became his successor in the academy as professor of mathematics. His greatest discovery is that of the barometer, of which his own account is given in his *Leizoni accademiche* (Florence, 1715). He published *Opera Geometrica* (4to., Florence, 1644).

TORRIGIANO, Pietro, an Italian sculptor, born in Florence about 1475, died in Seville in 1522. He studied his art in company with Michel Angelo in the gardens of Lorenzo de' Medici; but having in a fit of jealous rage assaulted his fellow pupil and permanently disfigured him by a severe blow upon the nose, he was obliged to leave Florence. For several years he was a soldier, but resumed his chisel, and executed small bronze figures for some Florentine merchants, whom he accompanied to England. He succeeded in attracting the notice of Henry VIII., for whom he executed a number of works, the most important of which was the tomb of Henry VII. in Westminster abbey, called by Lord Bacon "one of the stateliest and daintiest in Europe." In 1519 he visited Spain, and received several commissions. Having executed for the duke of Arcos a copy of a "Virgin and Child" which had been much admired, he was so enraged at the small sum which he received for it, that he broke the work in pieces. He was immediately imprisoned in the inquisition on a charge of sacrilege in destroying a figure of the Holy Virgin, and was condemned to death, but avoided a public execution by starving himself.

TORSION BALANCE. See Balance.

TORSK, or Tusk. See Cusk.

TORSO (It.), literally, the stump of a cabbage, lettuce, or similar plant, but commonly used to denote the trunk of a statue, from which the head, arms, and legs have been broken off. The most celebrated torso in existence is that in the Belvedere at Rome, which Michel Angelo made the subject of profound study. It was found in Rome in the latter part of the 15th century, and is ascribed to Apollonius, an Athenian sculptor who flourished in the 1st century B. C.

TORSTENSON, Lennart, count of Ortala, a Swedish general in the 30 years' war, born in Forstena, Aug. 17, 1603, died in Stockholm, April 17, 1651. In 1618 he became a page at the court of Gustavus Adolphus, and in this position remained 4 years, accompanying the king in his travels and campaigns. In one of the battles against the Poles he was sent by Gustavus with orders to a subordinate general; but perceiving as he rode that the enemy had changed his movement, he changed the order on his own responsibility in accordance with the new position of affairs. The king from that time placed great confidence in him, and as captain of his body guard he accompanied him in 1630 on his expedition to Germany. In these campaigns he gained great distinction, especially in the direction of the artillery arm of the service, was present at the battle of Leipsic or Breitenfeld in 1631, contributed materially to the passage of the Lech in 1632, and in the contest near Nuremberg the same year was taken prisoner. He was carried to Ingolstadt, one of the strongest fortresses of Bavaria, and the incarceration to which he was subjected was so severe as in a few months to destroy his health, and to leave him not only a confirmed invalid, but thenceforth liable to the acutest forms of disease. His release was finally effected by Wallenstein in exchange for Count Harrach. He was immediately placed by Oxenstiern at the head of an army corps, with which in 1633 he invaded Bavaria and captured Landsberg, but was obliged by ill health to resign his command to Marshal Horn and repair to Sweden. In 1634 he was made grand master of the artillery, and in this position he accompanied in 1635 Jacob de la Gardie, sent with an army of 20,000 men to act against the Poles in Prussia, and subsequently succeeded to the chief command. In the same year he also marched to the relief of Baner, and was with that leader in the campaign of 1636 and 1637. In 1639, acute disease compelling him again to return to his native country, he was there made a state councillor. When Baner died, by an express clause in his will he bequeathed the command of the army to Torstenson as the only one fit for the position; and in 1641 the latter accepted the charge with the rank of field marshal and generalissimo of the Swedish armies in Germany. His health was however so prostrated that his friends wished him to retire from the public service; but his only answer was: "I rather wish to die early than to survive myself." With a reënforcement of 8,000 men and a large sum of money he joined the confederates in the duchy of Lüneburg, and soon reëstablished discipline, restoring confidence and content to the troops, who were suffering from want of pay and provisions, and threatened with the desertion of their allies. Directing his attack against the hereditary states of Austria, he marched through the territories of Brandenburg into Silesia, stormed Glogau, and on May 21, 1642, gained a great victory at Schweidnitz over the imperialist general Albrecht of Saxe-Lauenburg. Upon this success he pushed into Moravia, reduced a number of cities, and spread terror to the very gates of Vienna; but the superiority of the Austrian forces compelled him to retreat to Saxony, where he laid siege to Leipsic. Here he was attacked on Nov. 2 by the imperialist forces under the archduke Leopold on the plain of Breitenfeld, on the very spot where Gustavus had gained his great victory. This "second battle of Leipsic," as it is sometimes called, resulted after a terrible conflict in the defeat of the Austrians, with the loss of 10,000 men killed and prisoners; and Torstenson, again resuming the offensive, reduced all Saxony under his power, marched a second time into Moravia, and laid the country under contribution as far as the Danube. In the mean while the Danish government had entered into a secret alliance with Austria; and to punish this conduct, Torstenson, on the receipt of private orders from the regency of Sweden, suddenly broke up his camp in Moravia in Sept. 1643, and in December burst into Holstein, and within 6 weeks made himself master of the peninsula, unprepared for resistance, with the exception of Glückstadt and Krempe. The mildness of the winter, which prevented him from crossing on the ice, alone saved the islands. An imperial army under Gallas hastened to the relief of Denmark, with the design of shutting up the Swedes in the Cimbric peninsula; but Torstenson unexpectedly forced his way through into Germany. Gallas followed, but was himself surrounded, and on Nov. 23, 1644, was totally defeated at Jüterbogk in an attempt to cut his way through. Torstenson now advanced into Bohemia, and on Feb. 24, 1645, gained the great battle of Jankowitz, in which the imperialists were defeated with the loss of 8,000 men, and their commander Hatzfeld captured. This secured the submission of Moravia, and the Swedish general, obtaining the control of the Danube, took even the fortifications which covered the head of the bridge at Vienna. Deserted here by his allies, he was obliged to retreat into Bohemia, and there in 1646 his increasing infirmities obliged him to give up the command to Wrangel. He now returned to Sweden, where in 1647 he was raised to the dignity of a count, and in 1648 was intrusted with the government of several provinces, and was also made one of the 8 councillors of the kingdom. Torstenson, though so weakened by the gout as to be under the necessity of being carried in a litter, was the most rapid in movement of the military leaders of his time; and it was said of him that while his body was confined to earth, his mind was free as air and his enterprises had wings.

TORT (Lat. *tortus*, from *torqueo*, to twist), in law, a private or civil wrong or injury, in contradistinction from a crime against the public or the state, but not technically including breaches of contract or other agreements. Torts are injuries or infringements of the civil rights that belong to individuals considered merely as individuals, while crimes are private wrongs which affect the community and so invade and violate the rights of society. The distinction between private injuries and public wrongs seems to be much dependent on the constitution and positive laws of civil society. So long as the harm done by an offence is limited to the single individual against whom it was directed, the offender commits only a private injury or a tort; but if the act, though immediately concerning an individual, disturbs the public order or safety and welfare, then the positive law interposes and elevates the hitherto private offence to the degree of a crime or of a misdemeanor. In some cases the private offence is entirely merged in what the legislature declares the public wrong. Thus robbery is clearly an injury to private property, and, so far as the injured party is concerned, might be in all cases compensated by damages. But the law long ago declared robbery to be in all cases a great public mischief and offence, never to be expiated by compensation; and ever since the crime has entirely overshadowed the tort. In other cases, the injury may be both a public and a private one, or at once a tort and a crime or misdemeanor. For example, the commission of a battery subjects the aggressor to a public prosecution as a disturber of the peace, while the party beaten may have his separate civil action for damages. Libel and nuisance are other examples of this twofold character.—As wrongs are privations or infringements of rights, so torts, being private wrongs, are infringements of private rights, or the rights of individuals. These rights respect either the person or the property. In the former class is included the right of personal security, in respect as well to the body as to the health and the reputation, and the violations of this right in one or other of these respects bear the names battery, assault, nuisance, slander, libel, and malicious prosecution. In this class is included also the right of personal liberty, which is violated by false imprisonment. Rights of property, real or personal, may be infringed by trespasses in various degrees, by waste, conversion, and fraud, and the more incorporeal of these rights by nuisance and by infringement of patents and copyrights and rights in trade marks. These several names of torts have been applied by long usage of the law to prescribed and well determined offences. But beside these, there are many torts not specifically designated or classed, because they do not affect well defined classes of rights, but vary with the peculiar circumstances of every case.—When one alleges that a tort has been committed against him, he must show at all events that he has been wronged. The mere fact that the act complained of has injured the plaintiff, does not entitle him to claim indemnity unless the act were also a breach of a legal obligation between the parties, resting either on their express agreement, or on the general policy and rules of the law. That, for example, my neighbor builds a wall just before windows of mine, to which it is conceded I have no prescriptive right as ancient lights; or that in a street occupied by private and costly dwellings my neighbor chooses to use his house for a shop, or convert it to other uses offensive to me and yet constituting no nuisance, gives me in neither case ground for action, however considerable the actual injury or damage may be to me. The reason is, that I have not been wronged; it is a case of what the law calls *damnum absque injuria*, damage but no wrong; no legal right of mine has been violated. The law favors, though it does not adopt in its whole extent, the principle of morals that every one ought so to use his own rights as not to injure others. On this ground it is disposed to recognize a wrong when it sees injury or damage, at any rate so far as to require him who has done the damage to justify his act. So when the wrong is clear, the law is disposed to presume injury even though it be not apparent. Every wrong, says Judge Story, imports damage in the very nature of it; and if no other damage is established, the party is entitled to nominal damage. To use Sir John Holt's quaint and familiar illustration: "If a man give another a cuff on the ear, though it cost him nothing, nay, not so much as a little *diachylon*, yet he shall have his action." It is on this principle, that, without proving any actual damage, one who has a right of way may maintain an action against an intruder, or one whose lands are flowed against him who constructs a dam so as to set back the water. So a voter can sustain suit against the authorities for refusing his ballot, even though his candidate was elected. These are cases of legal wrongs, infringements of legal rights; and even if no actual damage be proved, the injury or damage is the presumption of the law. To this class also belong those cases of torts in which the legal wrong consists in the doing of a mischievous act which is only likely to prove injurious to others, or even in the doing of a legal act in such a careless or negligent manner that injury may probably result; for carelessness of the rights of others is in itself morally wrong, and by the construction of law is legally wrong when injury results from it.—Property can be the medium of torts or wrongs to the owner only in virtue of its representing him. It must in some way be directly impressed with his personality, before any trespass upon it will assume the character of an injury to him. That this is the view of the law will appear from the consideration, on the one hand, that generally a wrong can be done to one through his property only when that is in his possession, or at least when he has an uncontested right to the immediate possession of it; or in other words, when his lands or his goods are part and parcel of himself, just like his limbs, only not so intimately and corporeally; and, on the other hand, from the consideration that the actual possessor of land for instance, even if he have no title, may yet maintain trespass for an intrusion against any one except the real owner, or him who has the right of possession. In short, the law inquires less about the complainant's ultimate rights, than whether his personality has been intruded upon. The commonest form of a tortious intrusion upon real property is called trespass *quare clausum fregit*, or for breaking and entering upon the plaintiff's close. A higher offence against a person, in respect to his property, than mere encroachment on his possession, is that which consists in a usurpation of the property itself. An injury of this nature is most likely to happen in respect to personal property, and one of the most frequent actions for torts of this nature is that of trover. One may be further injured in his rights of property by the effect of threats, mistake, or fraud. In the last respect, for example, an action lies when one knowingly utters a falsehood to the plaintiff with the design to deprive him of a benefit and to acquire it to himself, and damage naturally results from the plaintiff's belief. But it is not always necessary to show that the defendant intended to defraud the plaintiff particularly. Thus one who makes a false recommendation of another, representing him to be solvent and trustworthy, and with the purpose of obtaining credit for him, is liable to any one who gives credit to the report and thereby suffers injury.—Passing from rights in corporeal and tangible things to rights which, though incidental in great part to corporeal property, are yet in themselves incorporeal and less specific or definable, we meet the tort of nuisance, which consists in injury to the more natural rights of individuals, and the tort of infringement of patent and copyrights and rights to trade marks, which are rights created and assured by the positive law.—In our examination of torts we have thus far considered persons only in their natural capacity. It is obvious that new rights arise and new wrongs become possible when the individual is clothed with an artificial character; when, for example, he becomes a sheriff, a magistrate, or other public officer. The new functions with which he is invested give him capacity for doing official wrongs; and these, as they affect private individuals, form new classes of torts.—A corporation is liable like an individual for its torts. Thus a turnpike company has been held to answer for injuries resulting from defect in a bridge, and a canal company for damages caused by a want of repair of its locks. A corporation is liable for the wrongful acts of its officers, either where they are expressly authorized to do the acts, or where they were done *bona fide* in pursuance of a general authority. But, generally speaking, it cannot be held for any offences by its servants that are properly, in any case, only personal acts, like malicious prosecution, slander, or false imprisonment. But a corporation has been held responsible for an assault and battery committed by a servant acting under its authority. Banks are liable for the frauds and mistakes of their officers, committed within the proper limits of the business; as in respect to entries in their books or to accounts of deposits. So they are liable, without special agreement, for the default of an agent or correspondent in respect to collections which the bank has specifically undertaken for its customers. But, according to the weight of authority (for the rule is not well established), a bank would not be answerable, upon such default, for losses on a note, payable at a distant place, and received by it, in the ordinary course of business, as the mere local medium of communication with the real collecting agent, provided always that the bank has used good faith and reasonable care in the selection of such agent or correspondent. Municipal corporations are liable in tort for the same acts that would warrant an action against individuals, if such acts are done by the authority of the corporation or of a branch or bureau of its government, authorized to act in the premises to which the particular act relates. Thus they must answer for nuisances on their lands, for injuries resulting from the want of care or skill on the part of a public surveyor, or from the careless performance of street grading, or from neglect to repair streets, sewers, and drains. The civil liability of municipal corporations for injuries sustained by defects in the highway is generally determined by express statutes. They usually require the way "to be kept safe and convenient," and whether this requirement has been complied with or not, is a question for the jury.—The various kinds of torts, and of actions for tort, are treated specifically under the titles ASSAULT, ATTACHMENT, COPYRIGHT, EXECUTION, LIBEL, NUISANCE, PATENTS, SERVANT, SHERIFF, SLANDER, TRADE MARK, TRESPASS, TROVER, &c.

TORTOISE, the popular name of the chelonian reptiles whose habits are wholly or in part terrestrial and fluviatile, including all the testudinata except the marine species or turtles —that is, the *amydæ* of Oppel as distinguished from the *chelonii* of the same author. Their general characters have been given under TESTUDINATA. The sub-order *amydæ*, according to Prof. Agassiz, comprises the following 7 families, not equally related to each other: *trionychidæ* or soft tortoises, *chelyoidæ* (the matamata), *hydraspididæ*, *chelydroidæ* or snappers, *cinosternoidæ* or mud tortoises, *emydoidæ* or terrapins, and *testudinina* or land tortoises. Of the very numerous species here included, space will permit the mention of only a few of the typical forms in the above order of families. Duméril and Bibron divide the *amydæ*, according to habitat, into *chersites* or land tortoises, corresponding to *testudinina*, and *elodites* or marsh tortoises, including all the other families except the *trionychidæ*, which form their *potamites* or river tortoises. Though some pass nearly all their life in the water, none are entirely aquatic, and none can swim unsupported for great distances; when in the water, they usually remain at the bottom, and seldom swim freely except when seeking or leaving it. Their locomotion is a kind of walking, the weight being about equally distributed on the front and hind limbs, which have nearly the same development, the motions of each pair alternating with each other. The shield or carapace is more symmetrical than in the turtles; the feet are always distinct from the legs, and movable upon them; the toes are either separate and short, or united by a web capable of expansion and contraction; the limbs can generally be withdrawn under the carapace, and the head wholly or partially. The tortoises rank higher in the order than the turtles.—In the *trionychidæ* the carapace is flat, thin, and oval, and very incomplete, the ribs united only on the median line, and extending thence to the margin like spokes of a wheel; it is covered with a tough skin, flexible on the margins; neck long and flexible; head pointed, and terminating in a long leathery snout; jaws covered with a horny sheath, and the lips fleshy; feet short, broad, and strong, 5-toed and fully webbed, 3 of the toes with claws; limbs only partially retractile and moving horizontally; skin loose and free about the neck and limbs. Of the 3 North American genera, all occur to the north of the 21st isothermal line, while those of the old world are found only to the south of that line; the American species extend over the whole continent east of the Rocky mountains, and as far north as the great lakes and the upper St. Lawrence; the foreign species are found in the warm regions of S. E. Asia and Africa. The oldest geological deposit in which any of this family has been discovered is the greensand of New Jersey. They are active species, preferring the muddy bottom of shallow water, sometimes lying concealed in the mud with only a part of the head exposed, taking breath from time to time by stretching up their long neck and raising the tip of the snout above the surface; they can remain under water more than half an hour at a time, rarely going on land, where their movements are awkward; in the water they move rapidly, striking suddenly at objects by means of their long neck; they prey principally on fish, seizing also frogs, small birds, and young alligators and lizards; the species found in the Nile is very destructive to young crocodiles; they have been known to attack persons while bathing. They are very wary, but are frequently caught by hooks baited with a live fish; their flesh is highly esteemed. Their eggs are numerous, spherical, and very brittle; they are deposited on sandy shores near the water in April and May, and the young appear in July. The genus *trionyx* (Wagler), equivalent to *cryptopus* (Dum. and Bibr.), is peculiar to Asia and Africa, the species of this country formerly referred to it belonging to the genera *aspidonectes* (Wagler), *platypeltis* (Fitz.), and *amyda* (Ag.). The common soft-shelled tortoise of the northern states (*A. spinifer*, Ag.) attains a length of 14 inches; it is yellowish brown, beneath white, mottled, streaked, and dotted with black; a blunt keel along the median line slopes uniformly to the sides, and the anterior margin is furnished with spines; it is found from Lake Champlain to Pennsylvania and west to the Missouri and Mississippi rivers; its flesh is very delicate. Other species of this genus are found in the south-western states. The common trionyx of the southern states (*P. ferox*, Fitz.) much resembles the northern species, and has been generally confounded with it; the head, however, is shorter, wider, and higher, descending steeply to the long proboscis, which, as in all the family, is not an organ of smell, but rather of touch and for respiratory purposes, in the former sense acting like the snout of the moles and shrews; nostrils terminal and vertical; mouth large but short; jaws strong, blunt, and adapted for crushing; it attains a length of 18 and a width of 16 inches; there are well defined black dots on the back, and the lower surface is white; it is found only from Georgia to western Louisiana. In the *A. mutica* (Fitz.), found from New York to Pennsylvania and west to the tributaries of the Missouri and upper Mississippi, and in Lakes Erie and Ontario, the head and jaws are longer and narrower; the carapace is smooth, and the lower parts uniform whitish; it is light brown above with minute dark spots, and has a well marked depression along the middle of the back; it feeds principally on aquatic larvæ; it attains a length of 12 and a width of 10 inches. Very large species of this family were brought here from western equatorial Africa by Mr. Du Chaillu.—The *chelyoidæ* somewhat resemble the preceding family, but the head and neck are more retractile and furnished with numerous membranous fringes and lobes of singular form; the carapace is flattened, covering about ½ of the neck, thick, completely ossified and regularly divided into plates; head broad and flat, turned to one side under the shield; eyes far forward, directed upward and outward; snout long and membranous; jaws weak, neither sharp-edged nor pointed; mouth wide with fleshy lips, adapted for taking soft and minute prey; the jaws may be opened and shut quickly and continuously like a duck's bill; legs short and stout, not retractile, and feet broad, 5-toed, with long, sharp claws, only 4 on the hind toes. There is only the single genus *chelys* (Dum.), and a single species, the matamata (*C. matamata*, Dum.), attaining a length of 2 or 3 feet; it inhabits the stagnant waters of tropical South America, feeding on fish; it is captured for its excellent flesh.—The *hydraspididæ*, containing the genera *platemys*, *podocnemys*, &c., were united to the chelyoids by J. E. Gray, the two forming the *élodites pleurodères* of Duméril and Bibron. The neck is long, the head retractile or bent laterally under the shield; in some the skull presents the union of the temporal and parietal bones to form a broad roof over the temporal region, as in marine turtles, combining thus the family characters of the two suborders; Prof. Agassiz thinks that *podocnemys* will be found to agree more closely with the earlier geological types than with any other, and that the group of *pleurodères* bears the same relation to other testudinates that the marsupials do to ordinary mammals. The sexual differences are so great that they have been mistaken for specific; the tail of the male is much the longest, and in this sex there are sharp asperities between the joints of the hind legs; the colors are also different. This group is foreign to the United States, and mostly South American, a few being found in Africa and Madagascar.—The *chelydroidæ*, which have been sufficiently described in the article Snapping Turtle, are thoroughly aquatic, and the lowest of the *amydæ* except the preceding families; they are characterized by their keeled back, serrated margin, broad, flat, and imperfectly retractile head, narrow and cross-like sternum, and large tail. There is one species (*platysternum*, Gray) in China, and one of each of the genera *chelydra* (Schweig.) and *gypochelys* (Ag.) in North America; this is a very singular geographical distribution, especially as they are found only to the east of the Rocky mountains; they existed, however, in Europe in the miocene period. The eggs are usually spherical, but sometimes ovate; when hatched the young have a circular body.—The *cinosternoidæ* have a long and narrow body, the carapace rising to behind the middle, and thence descending steeply backward; the whole shield is ossified, covered with large horny scales, and as wide behind as in front, with a tendency of the edges to round up and turn inward; the sternum is less extensive than in the succeeding families, and the pelvis more movable, the former with an odd bone and divided longitudinally into two symmetrical halves; the tail is neither long nor strong enough to bear any of the weight of the body, and in the male ends in a horny nail; legs slender, feet short and round, toes freely movable and webbed, and the whole very flexible; head long behind and short in front of the eyes, pointed, with the small mouth underneath; alveolar ridge sharp, the lower jaw ending in a sharp point; neck long and slender; the plastron is sometimes hinged. In average size they are the smallest of the order, the least being about 4 and the largest 9 inches in length; all are American, and no trace of their fossil existence has been discovered; the sexes are very different. They live mostly in water and in the mud, coming out to bask in the sun in places where they can readily drop into the water at the approach of danger; their food is principally animal, and their motions quick, though feeble and awkward; generally timid, they bite fiercely if attacked while feeding, like the insectivora among mammals. The colors are generally dark, sometimes with reddish, greenish, and yellowish tints. They lay 3 to 5 eggs, on the shore near the water, in holes dug by their hind feet; they are elongated, with a smooth and shining surface, thick, and brittle. In the common mud tortoise (*thyrosternum Pennsylvanicum*, Ag.), the jaws are strong and cutting, and the mouth long and narrow; it is dusky brown above, yellowish dusky or brownish below; chin and throat dirty yellow, with the warts on the latter brighter; it is usually about 3⅛ inches long, nearly 3 wide, and 1¾ high. It is found from Pennsylvania to Florida, and west to the Mississippi valley; the anterior and posterior parts of the sternum are movable on the central piece; it abounds in muddy ponds, feeding on small fish and aquatic insects and larvæ; it is a pest to anglers, seizing the bait set for better game; it has a slight odor of musk, but less so than the next species. The musk tortoise (*ozotheca odorata*, Ag.) has the nose projecting far beyond the end of the jaw, and the alveolar ridge sharp and cutting; the color above is black or dusky, clouded with brown, and dirty yellowish white below; a yellowish white line from the snout over each eye and along the neck; limbs dingy white below; it is about 3⅛ inches long, 2⅛ wide, and 1⅛ high. It ranges from New England to Florida, and west to the Mississippi; the habits are like those of the mud tortoise; a favorite habitat is a Carolina rice field, where in the ditches it finds a plenty of small fish and tadpoles; it emits when alive a strong odor of musk. The genus *cinosternum* (Spix) belongs in Central and South America.—The *emydoidæ* are most numerous in species, over 60 being described, presenting great differences in size, structure, and habits. The body is ovate, swelling in the centre, the margin with a tendency to spread outward; the carapace is completely ossified and united by sutures, high and irregularly convex in all directions; plastron long and broad, and sometimes hinged; the jaws horny, without lips, and not terminating in long sharp points; head, neck, and limbs completely retractile; nostrils at the end of the snout, which is not prolonged into a proboscis; toes long and webbed, or short and free, according as the habits are aquatic or terrestrial; skin of head, neck, limbs, and tail more or less scaly. They are principally aquatic, though some are terrestrial, the limbs moving horizontally while swimming, and walking being performed on the whole foot (as in plantigrades); they are generally of moderate size, the smallest being 4 and the largest (the aquatic) 15 inches in length. The food is both animal and vegetable, consisting of fish, worms, larvæ, berries, leaves, and grass; they are not ferocious, and are unable to catch an active prey; they are most abundant in warm regions. The eggs are laid in holes dug by their hind legs, the terrestrial species laying 2 to 7, and the aquatic 10 to more than 30; the shell is less calcareous and more flexible than is usual; the shape is oblong. The young are at first circular, growing more and more elliptical with age; the shield is not ossified till late in life. Though this family is most numerous in North America, there is not a single species described under the genus *emys* by herpetologists which belongs in it; the so called *cistudo Blandingii*, corresponding to the *emys* of Europe, is the only representative here of Brongniart's genus; the others belong to various genera as established by Agassiz in vol. i. of his "Contributions to the Natural History of the United States" (1857). The genera *ptychemys* (Ag.), *trachemys* (Ag.), *malacoclemmys* (Gray), and *deirochelys* (Ag.) have been described under TERRAPIN. The common and handsome painted tortoise (*chrysemys picta*, Gray) may be known by the yellow borders of the black dorsal scales, the blood-red blotches and lines on the marginal plates, limbs, and under part of tail, and the golden yellow sternum; hind toes fully webbed; there is a notch in the horny sheath of the upper jaw, the edge of each side projecting to form lateral teeth close together. It is found as far north as New Brunswick, through the eastern and middle states to South Carolina and Georgia; west of the Ohio it is replaced by the *C. marginata* (Ag.); it is about 6 inches long, 4⅛ wide, and 2½ high; it is most abundant in ditches and sluggish waters, spending most of the day basking in the sun; it is very timid, hibernates early, and is one of the first to appear in spring; it feeds on insects, worms, tadpoles, &c., and is very troublesome to anglers; it will survive only a few days out of the water. The speckled or spotted tortoise (*nanemys guttata*, Ag.) is another very common species, distinguished by its yellow dots on a black ground, and its blackish sternum bordered with yellow; the edge of the upper jaw is straight, slightly notched in front, with the snout rounded; the neck and loose skin scaly. It is found from New England to the Carolinas, and to the east of the Alleghanies; it often comes on land, to feed on worms and orthopterous insects; it is about 5 inches long, 3 wide, and 1¾ high. The geographic tortoise (*graptemys geographica*, Ag.) is so called from the network of reddish brown lines spread irregularly over the dark brown carapace, somewhat resembling the outlines of countries on a map; the head is very large, and the alveolar surface flat, smooth, and horizontal; upper jaw without a notch, and the end of the lower spoon-shaped; there is a ridge along the back. It is one of the most active and bold of the family, and is found from New York and Pennsylvania to Michigan, Tennessee, and Arkansas; it is over 8 inches long, 6 inches wide, and 8 inches high, with a tail of 2½ inches. The sculptured tortoise (*glyptemys insculpta*, Ag.) is a very common species in the northern states and as far south as New Jersey; the carapace is reddish brown, each scale with radiating yellow ridges, often smoothed down in old specimens; marginal plates and sternum yellow, each with a black spot at the posterior angle, and generally with concentric striæ; limbs brick-dust color below; the upper jaw is in the form of a bill, arched downward and notched at tip, and the lower jaw arched upward; it is 8 inches long, 5 broad, and about 3 high, with a tail of over 2 inches; it passes long periods of time away from water. Blanding's tortoise (*emys meleagris*, Ag.) is the only true species of the genus here; it is black above with numerous yellow spots, sometimes arranged in lines; below dusky yellow, each plate with a large quadrangular dark spot at the outer and posterior angle; the alveolar surface is narrow, and its horny sheath notched in front; the plastron is not united by suture to the carapace, and is hinged in the middle, the two parts being raised to meet it when the animal withdraws into its shell; the head is long and wide, and the mouth broad. The young are nearly circular, black and spotless above, and the scales granular; the sternum black with a white edge; they elongate rapidly with growth. It is found from New England westward to Wisconsin, being most abundant on the prairies, and very terrestrial in its habits; it is 8 inches long, 5½ wide, 3 high, with a tail of 2¾ inches. The common fresh water tortoise of the south and east of Europe (*E. lutaria*, Merr.) is about 9 inches long, blackish above with interrupted light yellow stripes; it shuts its shell less close than the box tortoises; it feeds on aquatic insects, small fishes, tadpoles, slugs, &c.; its flesh is much esteemed, and in order to fatten it bread and tender herbage are supplied in parks adapted for the purpose. The box or checkered tortoise (*cistudo Virginea*, Ag.; *C. clausa* and *Carolina* of other authors) has a rough and strong shell, generally of a light brownish color with very numerous bright yellow blotches and lines, more or less radiating, giving somewhat the appearance of tortoise shell; sternum usually yellowish with dark blotches; the head is long and very high, alveolar edge narrow, with upper jaw projecting downward like a beak; hind feet plantigrade; plastron with a hinge in the middle, so that the anterior and posterior portion can each be brought in contact with the carapace, and enclose the animal in a perfect box. It is about 6½ inches long, 4½ wide, and 2¾ high; it is found from New England south to the Carolinas, and west to Michigan; it is entirely terrestrial, and a very poor swimmer; it is common in the pine barrens of the southern states, where it is called cooter and pine terrapin by the negroes; it feeds on insects and succulent plants, and is easily domesticated. In the south and west are other species with only 3 toes.—In the *testudinina* or land tortoises the carapace is entirely ossified, very convex in the middle region, but well balanced; the plastron is broad, flat, and solid; openings for protrusion of limbs small and narrow; head, limbs, and tail completely retractile within the shell, and the plastron in some with movable lobes; the horny plates touch each other at the edges, and exhibit concentric lines of growth; head small and shielded, nose broad, and eyes far apart; alveolar margin with a sharp edge, and the jaws fitting closely by ridges and furrows; skin everywhere more or less scaly; toes mostly concealed under the skin, as far as the last joints, which are free and covered by flat sharp nails, usually 5 anterior and 4 posterior; feet short, stout, and somewhat clubbed; the great intestine is longer and the lungs larger than in any other testudinate, in relation with the greater convexity of the shell. They are most abundant in warm climates, and are the largest of the order, the great Galapagos tortoise being 3 to 4 feet long, the African coui (*psammobates radiatus*, Fitz.) 1½, the gopher 1, and the common European land tortoise 8 inches (the smallest of the family); here also belongs the fossil gigantic *colossochelys Atlas* (Cautl. and Falc.), from the Sivalik hills, which must have measured nearly 18 feet in length, and found with the great extinct pachyderms which it so much resembled in gait and habits. It is singular that there are no tortoises indigenous to the British islands, though they might be easily naturalized there. All the American *testudinina* belong to the genus *xerobates* (Ag.). They live entirely on land, and when put into water walk on the bottom; the body is raised on the last joint of the toes, and the gait is firmer, more steady, and less slow than in any other tortoise. They are harmless, offering no resistance when attacked, trusting for protection to their shield, within which the head is drawn very far back, the neck being bent like the letter S and vertically; their food is exclusively vegetable, consisting of succulent plants and fleshy fruits. There are only 8 genera, but many species. In *xerobates* the front legs are compressed, and the feet have large flat nails, but not a plantigrade palm; the hind feet are plantigrade; the head is very broad, mouth wide, lower jaw high, and both with sharp ridges; the *X. Carolinus* (Ag.), or *testudo polyphemus* (Daudin), has been described under GOPHER. In the African genus *kinixys* (Bell) the posterior part of the dorsal shield is movable downward, the hinge being between the 5th and 6th ribs; in *pyxis* (Bell), from the East Indies, the anterior part of the plastron is movable. In the European land tortoise (*testudo Græca*, Linn.) the carapace is oval, somewhat widest and gibbous behind, marbled with black and yellow; plastron pale yellow with a wide blackish band down each side; legs short, and tail ending in a horny tip. It is found in Spain, Italy, Greece, and other countries bordering on the Mediterranean; it has frequently been carried to England, where it has been domesticated and known to live more than a century. This is probably the species which, according to fable, Mercury found after an inundation of the Nile, and which from its carapace and dried tendons gave out a musical sound when struck by him, and thus led him to construct the *testudo* or ancient lyre, afterward presented to Apollo and the Muses.—The Galapagos tortoise (*megalochelys Indica*, Fitz.; *testudo elephantopus*, Harlan) is the largest of the order, frequently measuring 12 feet in circumference; the shell is very convex and of a deep brown color. It is very fond of water, drinking large quantities, and delighting to wallow in the mud like a pachyderm; some live in the mountains and others in the low lands of the Galapagos islands, and the latter in their journeys after water in the elevated regions have worn well beaten paths, which led mariners to the discovery of the much coveted springs, often at a great distance from the shore; they drink by immersing the head up to the eyes, and swallowing great mouthfuls, about 10 per minute according to Darwin; their flesh is excellent, and largely used both fresh and salted, and a very clear oil is made from the fat. They feed on succulent plants and vegetables, and in captivity are fond of cabbage, lettuce, and marrows; they were formerly very numerous in these islands, and probably live for centuries; their gait is very slow, about 2 miles in 24 hours, though they have been known to travel 4 miles in the same time. The eggs are laid in October in the sand, and are about 8 inches in circumference; the young are devoured by birds of prey; in Great Britain, where numbers have been kept alive, they go under ground in November and reappear in the middle of April; many have been seen in the United States.

TORTOLA, one of the Virgin group of West India islands, belonging to Great Britain, lying between Virgin Gorda and St. John's, in lat. 18° 24′ N., long. 64° 32′ W.; pop. in 1851, about 10,000. It is 12 m. long by 2 to 4 broad, and has a rough and mountainous surface, rising to the height of over 1,600 feet. There are several bays, and on the N., at Tortola, the chief town, is an excellent landlocked harbor. It exports sugar, molasses, rum, and copper ore. This is the most important of the British Virgin islands, and is the seat of the lieutenant-governor and the administrative council. The climate is unhealthy.

TORTOSA (anc. *Dertosa*), a walled city of Catalonia, Spain, in the province of Tarragona, situated on the left bank of the Ebro, 48 m. S. W. from Tarragona; pop. 20,578. The town stands on the slope of a hill, and is entered by 8 gates; the streets are badly laid out, narrow, ill paved, and some of them very steep. There are several small squares, and the houses are generally well built. It has a Gothic cathedral, numerous churches, and 6 suppressed convents. Cotton and linen goods, glass, earthenware, cordage, wax candles, leather, soap, brandy, starch, and baskets are manufactured. The river is navigable for vessels of about 100 tons, and a considerable trade is carried on. Quarries of valuable marble, known as Tortosa jasper, are situated about 8 m. from the city. —Scipio conferred the privilege of a Roman *municipium* upon Tortosa. It was early taken by the Moors, but was wrested from them in 811 by Louis le Débonnaire. They afterward retook it, and it became the harbor of a nest of pirates. A crusade was proclaimed against it in 1148 by Eugenius III., and it was captured. The Moors made desperate efforts to retake it, but the Christian women defended the walls while the men sallied out and put the besiegers to flight. Many privileges were conferred upon the women in reward for the bravery displayed, and in 1170 the military order of La Hacha, or the Flambeau, was instituted for them. The French took Tortosa in 1798, and again in 1811, when Gen. Lilli was found guilty of cowardice and condemned to death for surrendering it, but was pardoned by Ferdinand VII.

TORTUGA (Span., "the turtle"). I. One of the Leeward islands, in the Caribbean sea, 55 m. W. from Margarita; length from E. to W. 15 m., breadth 8 m. It belongs to Venezuela. II. A small island lying off the N. W. coast of Hayti, in lat. 20° N., long. 72° 36′ W.; length from E. to W. 22 m., breadth 5 m. III. An island in the gulf of California, 85 m. S. from the island of Tiburon.

TORTUGAS. I. A group of 10 islets or keys, also called the Dry Tortugas, at the entrance of the gulf of Mexico, 120 m. W. S. W. from Cape Sable, the extreme southern point of Florida. They are low coral islets, and partly covered with mangrove bushes. A lighthouse has been erected on Bush or Garden key; and in 1861–'2 refractory members of several volunteer regiments were sent thither to work upon the construction of Fort Jefferson. II. An island of the West Indies, off the N. E. coast of Cuba, from which it is only separated by a narrow channel called El Savirral. It forms the entrance to the harbor of Nuevitas, and is 26 m. long from N. W. to S. E. and about 6 m. wide.

TORTURE, properly, an infliction of severe pain upon an accused person to induce a confession of guilt, or upon a criminal to extort a revelation of his accomplices. The term is frequently used carelessly to designate severe and unusual punishment inflicted for crime, but improperly, as it is never spoken of by judicial writers as a punishment. By legal writers on the continent of Europe and the earlier English authors, the word question (Lat. *quæstio*, a seeking) is used as a synonyme of torture; the object being a search for the truth in regard to the criminality of the tortured person, or the names of his accomplices, by the compulsion of suffering. Torture is divided as to intensity into the "question ordinary," a comparatively mild application of the instruments used in torturing, and the "question extraordinary," where these means were used to the greatest extent compatible with the preservation of life in the victim. The threats of torture were divided into "verbal territion," when the executioner described the torture, and "real territion," when the victim was placed upon the rack but not tortured. As to the time of its application, it was called the "question preparatory" when used for the purpose of compelling the accused to confess his own crime, and the "question *préalable* or preliminary" when applied to extort from a criminal the revelation of his accomplices. Torture seems to have been early practised as a means of discovering guilt, both judicially and privately, but was not inflicted on freemen or citizens till the time of the Roman emperors, except in cases of suspected crime against the state itself. The Greeks inflicted it on their slaves, and after their subjugation by the Romans it was inflicted on those who had not a claim to the name of Roman citizen; the oath of the citizen was considered sufficient. Under the emperors this distinction was not long continued, and men and women even of patrician birth were subjected to torture to compel confession of crimes existing only in the morbid imagination of tyrants. Wherever the code of Justinian was adopted as the basis of the legal system of European nations during the middle ages, judicial torture formed a feature of the examination of persons accused of crime; in the Teutonic nations it gradually took the place of ordeals and the trial by battle. In England it was probably never considered a part of the common law, though the *peine forte et dure*, which was used to compel a prisoner to plead to the indictment, had certainly some countenance from that law. (See PEINE FORTE ET DURE.) It was however recognized as one of the prerogatives of the crown to order it, and was thus in occasional use up to 1640, when the last case occurred. Severe and cruel as were the punishments inflicted by the ecclesiastical law, there is no evidence of a resort to "the question" by the inquisition or any other ecclesiastical court before 1252, when Innocent IV. called upon the civil arm to use it to induce confessions and accusations by offenders. Not long after this period the necessity of secrecy in the proceedings of the inquisition led to its extensive adoption, and to refinements of cruelty in its use before unknown. Judicial torture continued to be practised in most of the European states till the latter part of the last century. In 1780 the "question preparatory" was discontinued by a decree of Louis XVI., and in 1789 torture in general was abolished throughout the French dominions. In Russia it was abolished in 1801. In Austria, Prussia, and Saxony it was suspended soon after the middle of the last century, but in several of the smaller German states it continued on the statute books till the present century. Beccaria, Thomasius, Hommel, Voltaire, and Howard were instrumental in bringing about its discontinuance. In the United States torture has never been reckoned an adjunct of judicial examination, though there are traces of the belief in its necessity among the lower classes in some of the early colonial enactments.—The instruments of torture have varied at different periods and in different countries. Among the Romans, the scourge was the usual instrument; the *equuleus*, a sort of upright rack, was an invention of the Romans used upon their slaves, to which pincers to tear the flesh, fire, &c., were added. The rack as used in the tower of London was of uncertain origin; it consisted of an open frame of oak under which the prisoner was laid on his back, and his wrists and ankles fastened by ropes to rollers at the end of the frame, which were tightened by means of a ratchet wheel till the whole body was brought to a level with the top of the rollers, and in the "question extraordinary" till the joints were dislocated. The "boot" was the favorite French instrument of torture; in this rings of iron were passed around the legs, and wooden wedges driven between them and the flesh till the muscles were reduced to jelly. Among other instruments used to test the power of human endurance were the thumbscrew; iron gauntlets; the "little ease," a narrow cell in which the prisoner was confined for several days, and in which the only position possible was one which soon cramped every muscle; the "scavenger's daughter" (a corruption of "Skevington's daughter"), an instrument invented by Sir William Skevington, which so compressed the body as to start the blood from the nostrils, and often also from the hands and feet; the torture by water; and numerous other inventions capable of producing intense suffering.—Though, as before remarked, not properly reckoned as tortures, some notice should here be taken of those forms of punishment which aimed at making the penalties of crime terrible by the intensity of the physical suffering they inflicted. Ingenuity seemingly exhausted its powers in the invention of modes of inflicting agony upon the offender against the laws. Crucifixion, fastening to the cross with cords, and anointing the body with honey that insects might torment the helpless victim, hanging up in a cage, suspending the culprit by the arms while weights were tied to the feet, the fastening of limbs to trees which were forced into proximity to each other and then suffered to fly apart, pouring melted lead into the ears, immersing one or more limbs or the whole body in boiling oil, suspending over a slow fire, plucking out the hair in masses, slitting the nostrils and lips, putting out the eyes, cropping, cutting off the hands, branding, mutilation, crushing the body with heavy weights, starvation, deprivation of air, confinement in *oubliettes* or bottle-like prisons without ventilation, pulling out the nails, and breaking on the wheel, were a few of the many means by which punishment was inflicted, often for offences of a secondary grade, within the past 200 years. To the same humane writers who effected the discontinuance of torture, is due in a great degree also the abolition of these cruel punishments.—See Jardine, "On the Use of Torture in the Criminal Law of England" (8vo., London, 1839); Maclaurin, "Introduction to Criminal Trials;" Auguste Nicolas, *Si la torture est un moyen sûr à vérifier les crimes secrets* (12mo., 1682); Reitemaier, *Sur la question chez les Grecs et les Romains;* and Mittermaier, *Das Deutsche Strafverfahren*, vol. i.

TORY, a term used to designate one of the principal political parties of Great Britain. It first occurs in English history in 1679, during the struggle in parliament occasioned by the introduction of the bill for the exclusion of the duke of York from the line of succession, and was applied by the advocates of the bill, the whigs of that day, to its opponents, as a title of obloquy or contempt. "The exclusioners," says Roger North, "observing that the duke favored Irishmen, all his friends, or those accounted such, by appearing against the exclusion, were straight become Irish, and in the *copia* of the factious language the word tory was entertained, which signified the most despicable savages among the wild Irish; and being a vocal, clear-sounding word, readily pronounced, it kept its hold, and took possession of the foul mouths of the faction, and everywhere as these men passed we could observe them breathe little else but tory." ("Examen," p. 321.) Hence Dr. Johnson says that the word tory is "a cant term, derived, I suppose, from an Irish word signifying a savage." In the opinion of some authors the tories were originally merely the successors of the cavaliers of the civil wars, men who believed that the maintenance of a royal line was the end or the necessary means of a lawful government; who vindicated the divine right of kings, and held high notions of prerogative; in other words, the court party in contradistinction to the country party. However accurate this definition of the party may have been at the time the name was first applied to it, the tories subsequently took a broader ground, and their leading principle became the maintenance of things as they have been, or at least as they are; whence Johnson gives the following definition: "One who adheres to the ancient constitution of the state and the apostolical hierarchy of the church of England." Except during the administration of Oxford and Bolingbroke (1710–'14), the tories did not come into power until near the middle of the 18th century; but from that time until the agitation of the reform bill in parliament they held almost uninterrupted ascendency. Since 1830 their influence has been less predominant. The word tory, however, has for several years ceased to designate an existing party, but is rather applied to certain traditional maxims of public policy; and the political successors of the tories are now commonly known as conservatives, a term originally assumed in contradistinction to destructive, by which name the radical reformers were sometimes designated. —In the American war of independence the adherents to the crown were called tories; but after the termination of that contest the name dropped out of use in American politics.

TOTILA (properly Baduila), a Gothic king of Italy, died A. D. 552. He was duke of Friuli, served efficiently against the Greeks, and was chosen king in 541, upon the surrender of Vitiges at Ravenna. When Belisarius was withdrawn from the service against the Goths, Totila overran the greater part of Italy, and in 546 entered Rome by the treachery of some Isaurian sentries. Very few of the citizens were killed by the soldiers, and Totila held peaceful possession of the city until compelled to leave it in order to repair the reverses his armies had sustained in Lucania. In his absence Rome was recovered by Belisarius, and in 547 Totila was repulsed in the endeavor to retake it. In 548 Belisarius was again recalled to Constantinople, and Rome once more fell into the hands of Totila. In 552 Narses was sent into Italy by the emperor Justinian, and Totila advanced against him. A battle was fought at Tagina in Umbria, in which the forces of Totila were completely defeated, and he himself mortally wounded.

TOTLEBEN. See Todleben.

TOTT, François, baron de, a French adventurer, born in La Ferté-sous-Jouarre, Aug. 17, 1733, died in Tatzmansdorf, Hungary, in 1793. He was the son of a Hungarian exile, early entered the army, and in 1755 went to Constantinople as attaché to the French embassy. In 1763 he returned to France, and a few years afterward was made consul in the Crimea by the duke de Choiseul; but he became so involved in intrigues that in 1769 he was removed. Repairing to Constantinople, he entered the sultan's service, and continued in it until 1776, during which time, according to his own account, he had a great share in directing the military operations of Turkey. After his resignation he was sent by the French government to inspect the consular establishments of the Mediterranean ports from the archipelago to the Barbary states. Returning, he retired to private life, and prepared an account of his observations for 20 years, entitled *Mémoires sur les Turcs et les Tartares* (1784), which was translated into several languages, and long retained its popularity. In 1781 De Tott was made major-general, and afterward governor of Douai. This last position he held until 1790, when he was nearly murdered by the garrison, to whose republican principles he had opposed himself. He fled to Switzerland, then to Vienna, and died in obscurity.

TOTTEN, George Muirson, an American engineer, born in New Haven, Conn., May 28, 1809. He commenced his career as a civil engineer at 18 years of age, and until 1844 was employed upon railroads and canals in Massachusetts, Connecticut, Pennsylvania, New Jersey, Virginia, and North Carolina. He was next engaged for 5 years upon the survey and construction of the *Canal del Dique* in New Granada, and in 1849 was appointed engineer-in-chief of the Panama railroad, which in 1855 he brought to a successful completion. He has since been occupied with various engineering enterprises in the United States.

TOTTEN, JOSEPH GILBERT, an American officer of engineers, born in New Haven, Conn., in 1788. He was graduated at the military academy at West Point in June, 1805, and immediately appointed a 2d lieutenant of engineers. At the commencement of the war of 1812 he held the rank of captain, and for his services as chief engineer during the campaigns of 1813 and 1814, under Generals Dearborn and Macomb, he was brevetted successively major and lieutenant-colonel. In Sept. 1824, he was brevetted colonel for 10 years' faithful service. In 1838, having attained the intermediate grades, he was appointed colonel and chief engineer, and at the same time inspector of the military academy. He accompanied the army under Gen. Scott to Mexico in 1847 as chief engineer, and for "gallant and meritorious conduct at the siege of Vera Cruz" was in the same year brevetted a brigadier-general. In 1851 he prepared for the use of the war department a "Report on the subject of National Defences."

TOUCAN, a name given to the scansorial birds of the family *ramphastidæ*, derived from the Brazilian imitation of their note. The family is remarkable for the disproportionate size of the bill, which however is very light on account of its spongy texture; it is strengthened internally by a network of thin bony laminæ, freely supplied with vessels and nerves: it is broad at the base, without a cere, smooth, with the culmen curved, sides compressed, tip hooked, and the sides serrated; the tongue is long and slender, provided with numerous barbs on each side directed forward; the bill is usually adorned with bright colors which fade after death; the tarsi covered with transverse scutes, the quills almost concealed under the large coverts, the tail with 10 feathers; claws curved and sharp; toes 2 before and 2 behind; orbital region naked; furcula of 2 bony pieces, thin and not united below, and sternum with 2 deep incisions on each side behind. They are peculiar to tropical South America, living in flocks in the forests, where they make a great chattering as they hop from branch to branch in search of food; they feed principally on pulpy fruits, also on fish, eggs, larvæ, and small birds and reptiles; they are said to toss their food into the air, and to catch it in the open bill, swallowing it at once, though this is denied by Edwards. When roosting they throw their tail upward and forward, and rest the enormous bill on the back, giving them a lazy and grave look, which has caused the negroes to call them preachers. They are generally handsome birds, representing in America the hornbills of Asia and Africa; they are not powerful fliers, and are strictly arboreal, not climbing like the woodpeckers, but hopping among the branches with such grace and agility as to have suggested for one of them the specific name of Ariel. The nest is made in holes in trees, and the eggs are 2, rounded and white. They are strong and shy, posting a sentinel while they feed, whose warning cry resembles the word *tucano;* the skin is bluish, and the flesh eatable though rather tough; they sometimes commit great havoc with fruit, and are often killed for food and for their brilliant feathers; they are very sensitive to cold.—In the toucans proper (*ramphastos*, Linn.) the bill is higher and wider than the forehead, looking as if too large for the head and belonging to another bird; the nostrils are hidden behind the prominent base; wings short and rounded, with the first 4 quills graduated and narrowed at the tip, and the 5th the longest; tail short and nearly even; feet short and stout; the colors are generally black with patches of white, red, and yellow, especially under the chin. The toco toucan (*R. toco*, Gmel.) is 17 inches long, of which the bill is more than a half; plumage black with throat and rump white, vent red, bill orange red with black tip; it inhabits Guiana and Brazil, where it is often shot for its destructiveness. The yellow-breasted toucan (*R. tucanus*, Linn.) has a yellow throat, with red vent and breast spot, and the rest of the plumage black. There are more than a dozen other species.—In the genus *pteroglossus* (Illig.), generally called aracaris, the bill is much smaller and sometimes not out of proportion to the head, as high as the forehead, with the nostrils conspicuous at the base; 4th, 5th, and 6th quills longest; tail long and graduated; the colors are usually green, with red or yellow on the breast. There are more than 30 species, with habits similar to those of the last genus. The aracari toucan (*P. aracari*, Illig.) is 17 inches long, with a bill of 4 inches; plumage blackish green, with yellowish abdomen, red median abdominal bar and rump; upper mandible with a longitudinal black stripe. The many-banded toucan (*P. pluricinctus*, Gould) is 20 inches long, green with a scarlet rump, and the breast yellow with 2 black bands; it is found on the upper Amazon.—For descriptions and figures of this family, see Gould's "Monograph of the Ramphastidæ" (fol., London, 1834).

TOUCH, the modification of the common sensibility of the body, especially seated in the skin, whose adaptation for the purpose has been alluded to under that title. It is the sense through which we take cognizance of the palpable properties of bodies, and requires actual contact of the exciting substance with the skin, except in the sensations of heat and cold; by it we obtain an idea of resistance or weight, temperature, size, shape, smoothness or roughness, &c., assisted by the muscular sense; alone and of itself imperfect, it affords most important information concerning the external world by correcting many fallacies derived from the unaided sense of sight. It is most acute at the tips of the fingers, on the tongue, lips, portions of the mucous membrane, and on the nipples, where the sensory papillæ are the most numerous, each one receiving one or more nerve fibres. The papillæ are elevations of the surface of the cutis, averaging $\frac{1}{100}$ of an inch in height, and $\frac{1}{250}$ in diameter at the base; on the palms they are arranged in rows, as many, according to Weber, as 81 compound and 150 to 200 simple ones in the area of a square line; they are always covered by the epidermis or cuticle, to which they closely adhere, and which is thickest in the intervals of the rows; if the epidermis be removed, there is great sensitiveness to pain with the loss of tactile power; if it be too thick, as on the heel, touch is almost null. The nerve fibres appear to terminate in what has been called the axile body in the interior of the papilla, which, according to Wagner, its discoverer, is an organ *sui generis*. Kölliker considers it analogous to the bundles of fibrous tissue encircled by elastic fibres found in the substance of the cutis, and Huxley as a continuation and increased development of the neurilemma of the nerve tube and as analogous to the Pacinian bodies; these organs are found only in the papillæ of the most sensitive parts, and are therefore not essential to touch, serving rather to intensify tactile impressions where delicacy of this sense is required. The optic thalami at the base of the brain are considered by Carpenter as the ganglionic centres of the nerves of common sensation, which ascend to them from the spinal cord and the medulla oblongata; they are connected by the soft and posterior commissures; in like manner the striated bodies are connected with the anterior tract of the spinal cord, and from them issue the motor impulses in answer to the sensations excited through the former. All the afferent nerves, except those of special sense, apparently minister to the sense of touch, by virtue of their connection with the seat of common sensation in the brain; those of the lower extremities are less concerned in conveying sensations than those of the upper, though they are far more efficient in producing reflex movements, probably because they have more fibres whose centre is in the ganglionic substance of the spinal cord, and fewer which pass up to the brain.—The mind must be directed to sensations for them to be perceived; a sensation hardly at all painful to an inattentive or otherwise busily employed person, may become intolerable if the attention be directed to it. The mucous membranes differ remarkably from the skin in their inflammatory states not being accompanied by increased sensibility; a fortunate provision, as otherwise the simplest functions of respiration, digestion, nutrition, and excretion could not be performed without great pain under comparatively trifling morbid conditions. The acuteness of touch differs in various parts of the body, generally in proportion to the vascularity of the part; the non-vascular parts, like the hair, nails, and teeth, have no sense of touch, while on the skin the nerves are spread in a minute network. Its relative acuteness has been measured by Weber, by placing the legs of a pair of compasses on the skin, and approximating them until brought within the smallest distance at which they could be felt as distinct points, and with the following results: the point of the tongue, ½ a line; palmar surface of 3d finger, 1 line; red surface of lips, 2 lines; tip of nose, 3 lines; edge of dorsum of tongue, 4 lines; skin of cheek, palm of hand, and end of great toe, 5 lines; back of hand, 8 to 14 lines; back of foot, 18 lines; over spine, and in middle of arm and thigh, 30 lines. There are considerable variations in this respect in different individuals. There are many modifications of the sense of touch, one of the principal of which has been noticed under TASTE. The feeling of tickling is most easily excited in parts having a feeble sense of touch, as the arm pits, sides below the ribs, palms, and soles, while the sensitive points of the fingers cannot thus be affected. This sense is exceedingly acute in the flying membrane of the bats and in the whiskers of the carnivora and rodents. It is combined with movement in that most wonderful instrument, the human hand, with its power of pronation and supination, opposability of the thumb, and great mobility of the fingers. As regards heat and cold, it is remarkable that the sensory nerves cannot distinguish between frozen mercury or the intense cold of solidified carbonic acid gas and red-hot iron; so that the story of the savage who dropped a piece of ice because it burned his fingers, has a good physiological foundation. Cold, by retarding the capillary circulation and by its direct sedative influence, deadens the sense of touch; in like manner, pressure upon or disease of the nerve trunks, and various states of the brain receiving the sensory impressions, are accompanied by obtuseness of touch; prominent among the causes acting on the nervous centres are the influence of toxic and anæsthetic agents, obstructed circulation, and chronic inflammations; on the other hand, irritation and acute inflammation in the course of the nerves, at their peripheral terminations, or in the centres, may be accompanied by hyperæsthesia or excessive sensitiveness of the surface. Subjective sensations, or those dependent on internal causes, are very common in the sense of touch; those of pleasure and pain, heat and cold, itching and creeping sensations, &c., are familiar examples, and are especially the prerogatives of nervous persons. Touch may be greatly improved when the other senses are impaired or lost, partly from the greater attention given to the sensations, and partly from an increased development of the tactile organs from more frequent use; instances of the education of this sense are very remarkable and well known in the blind, who by their delicate touch have been enabled to read from raised letters, and to become eminent mathematicians, musicians, mechanics, naturalists, and sculptors; the fingers may even perform the work of eyes to the degree of distinguishing colors, by perceiving the differences in surfaces which reflect one colored ray and absorb the rest. It is, in the lower animals, most acute in the hands, feet, and prehensile tail of monkeys; in the lips and tongue of herbivora; in the snout of the elephant, pig, tapir, and mole; in the flying membrane, ears, and nasal appendages of bats, which can perceive even the vibrations of air; in birds, in the under surface of the toes and their webs, and in the sensitive skin of the mandibles of the duck tribe and some waders; in the under surface of the toes in many lizards, in the extensile tongue of the chameleon and serpents, in the naked skin of batrachians, and in the thumbs of the males of the latter during the reproductive season; in the antennæ and palpi of articulates, in the oral appendages of mollusks, and in the tentacles of radiates.

TOULMIN, Camilla. See Crosland.

TOULMIN, Joshua, D.D., an English clergyman, born in London, May 11, 1740, died in Birmingham, July 23, 1815. He was educated at St. Paul's school, and at the so called dissenting academy in the house of Dr. Samuel Morton Savage, and, after being licensed to preach, became pastor of a dissenting congregation in Colyton, and in 1765 of a Baptist congregation in Taunton, where he also conducted the business of a bookseller. He subsequently adopted Unitarian opinions, declined invitations to Unitarian pastorates in Gloucester and Yarmouth, received the degree of D.D. from Harvard college in 1794, and in 1804 was chosen one of the ministers of the Unitarian congregation at Birmingham, formerly presided over by Dr. Priestley, in which position he remained till his death. His principal publications were: "Memoirs of Socinus" (1777); "Letter to Dr. John Sturges on the Church Establishment" (1782); "Dissertations on the Internal Evidences of Christianity" (1785); "Review of the Life, Character, and Writings of John Biddle, M.A." (1789); an edition of Neal's "History of the Puritans," with notes and additions (5 vols., 1794-'7; reprinted, 3 vols., 1837); "Biographical Tribute to the Memory of Dr. Priestley" (1804); "Memoirs of the Rev. Samuel Bourne" (1809); and a "Historical View of the State of the Protestant Dissenters in England" (1814). He also published several volumes of sermons, and contributed to the "Theological Repository," "Monthly Magazine," and other periodicals.

TOULON, a maritime city of France, department of Var, situated at the head of a double bay of the Mediterranean, in lat. 43° 7′ N., long. 5° 56′ E., 30 m. S. E. from Marseilles, and 525 m. S. S. E. from Paris; pop. by the census of 1862, 84,987. Toulon stands upon ground which rises gradually from the sea, and is sheltered by a ridge of lofty mountains, extending round the bay. A tongue of land stretches nearly across the entrance of the bay, and, together with all the adjacent points, is strongly fortified. The town, in addition to ramparts, bastions, and ditches, has numerous forts and outworks upon the surrounding heights, and is entered by two gates. The streets are narrow and irregular, and the squares, with the exception of the Place d'Armes, are all small. Toulon is the second naval port of France, and has 3 great arsenals, a school of naval medicine and one of naval artillery, and various other institutions connected with the navy and with commerce, beside a college, botanical garden, observatory, &c. There are two harbors, separated from the inner road and from each other by piers. One of them is surrounded by good houses and quays, and is used for mercantile purposes; while the other is surrounded by extensive government buildings, which consist of several covered slips for building vessels, workshops of different kinds, and large storehouses containing supplies for the navy; 3,000 workmen are here employed. In the armories there is a fine collection of ancient arms, and numerous valuable models of vessels of various descriptions. The naval school has a good library attached, and there are prisons to accommodate about 5,000 convicts. There are manufactories of woollen goods, imitation morocco leather, soap, &c. Ship building is carried on, and there are several founderies.—Toulon was known as a harbor in the time of the Romans. During the middle ages it was several times taken and sacked by the Saracens. In the reign of Louis XII. a tower was begun, which Francis I. completed, to defend the town from the Barbary pirates. Henry IV. strengthened the fortifications, and Louis XIV. established a royal dockyard and expended large sums under the direction of Vauban in fortifying the town and improving the accommodation of the harbor. In 1707 the combined English and Dutch fleets made an unsuccessful attack upon it by sea, while the duke of Savoy attempted to take it by land. In 1793 the royalists surrendered Toulon to the British; and during the siege which ensued Bonaparte gave the first remarkable proofs of his great military talents. When the British were obliged to evacuate the place, they burned all the maritime establishments and the greater part of the French men-of-war. The republicans gave it up to general pillage and massacre in revenge for the inhabitants having admitted the British. They also took from it its rank of capital of the department, which has never been restored. Napoleon III. has enlarged the fortifications and almost doubled the extent of the city.

TOULOUSE (anc. *Tolosa*), a town of France, capital of the department of Haute-Garonne, situated on the Garonne at the junction of the canals du Midi and Brienne, and on the railroad from Bordeaux to Cette, 132 m. S. E. from Bordeaux and 200 m. N. W. from Marseilles;

pop. in 1862, permanent and floating, 113,229. The town is principally built upon the right bank, but part of it stands upon an island in the river, and the suburb of St. Cyprien occupies the left bank. The walls formerly surrounding it have been nearly all removed to make room for improvements. The streets are narrow and crooked, badly paved, and dirty. Considerable alterations, however, have lately been made, and the town is assuming a better appearance. Among the improvements may be mentioned the Place du Capitole and the Place Lafayette. The former consists of an extensive well built square, ornamented with fountains, with one side occupied by the *hôtel de ville*, and is the principal place of business; and the latter is circular, lined with handsome mansions, and on the E. side opens into a fine promenade. The cathedral was commenced early in the 13th century, but has been since extensively repaired and altered, and now presents a very irregular appearance. There are several other churches, the most remarkable of which is the old church of St. Sernin, in the Romanesque style. Toulouse has an artillery school, several societies for advancing knowledge, a university academy, a medical and many other schools, a public library, an observatory, a botanical garden, a museum, and a picture gallery. The houses are nearly all built of red brick, and are only remarkable for their clumsy and gloomy appearance. The river is navigable, and is crossed by a bridge 810 feet long and 72 feet broad. There are powder mills, a cannon foundery, and an arsenal. The manufactures consist chiefly of coarse woollen and cotton goods, starch, cutlery and hardware, earthenware, vermicelli, wax candles, and leather. *Pâtés de foie de canards*, or duck-liver pies, are made in great numbers and sent to other parts of France. An extensive trade is carried on, which is greatly facilitated by the water communication with both the Mediterranean and Atlantic. Toulouse is the see of an archbishop, and the seat of the court of appeals for several departments.—It is a place of great antiquity; but though the Romans ornamented it with many public buildings, no remains of any of them are now visible. The Visigoths captured it early in the 5th century, and made it the capital of their kingdom, which it continued to be for about 100 years. In 631 it became the capital of the Visigothic kingdom of Aquitaine, and it was ruled by independent counts from 778 to 1271, when it was united to the crown of France, after which it was the capital of Languedoc till the revolution. Its university and school of medicine were formerly very celebrated. The most remarkable event which has occurred at Toulouse in modern times was the battle fought in its immediate vicinity, April 10, 1814, between the British under Wellington and the French under Soult, in which the latter were defeated. Though Bonaparte had abdicated at the time, both generals were ignorant that hostilities had ceased.

TOURAINE, formerly a central province of France, now forming the greater part of the department of Indre-et-Loire, bounded by the provinces of Maine, Orléanais, Berry, Poitou, and Anjou. It was divided into Upper and Lower Touraine. The capital was Tours. The Loire formed the dividing line between the two parts of the province, and the Cher, the Vienne, the Creuse, the Oluise, and the Indre also drained it. In the time of Julius Cæsar Touraine was inhabited by a peaceful and somewhat indolent people, the Turones, who submitted to the Romans after some opposition. In the 5th century they were successively attacked by the Huns and the Visigoths, in 480 became subject to the Gothic king Euric, and in 507 to Clovis, king of the Franks; and after the death of Dagobert I. it became a part of the kingdom of Neustria, and later of the empire of Charlemagne. From 941 to 1004 it was an independent province ruled by Thibaut, count of Tours, and his son and grandson, and subsequently to that period was embraced in the more extended district, comprising also Champagne and Brie, over which the counts of Tours ruled. In 1045 the count of Anjou, having captured Thibaut III., compelled him to give Touraine for his ransom. In 1203 it was taken by Philip Augustus from King John of England and annexed to the French crown. It was erected into a duchy in 1360 by John the Good, which was held at one period by the earls of Douglas and Mary, queen of Scots. Francis, duke of Alençon (died 1584), was the last who held it as an apanage. Its delightful climate has made it always a favorite resort, and its soil has been the scene of numerous important battles and historical events. In the 16th century it was the battle ground between the Protestants and Catholics; and, a large proportion of its inhabitants being Protestants, the revocation of the edict of Nantes nearly ruined it.

TOURMALINE, a mineral composed of silicates of alumina, the earths, and iron, with from 5 to nearly 12 per cent. of boracic acid. It crystallizes in the hexagonal system, the two extremities of the prism being usually unlike. Hardness 7 to 7.5, or between quartz and topaz; specific gravity 2.94 to 3.3. It is found black (schorl), brown, blue (indicolite), green, red (rubellite), and rarely white or colorless (achroite). Sometimes the crystals are red at one extremity and green at the other, or red internally and green externally, or *vice versa*. Such specimens are found at Paris, Me., Chesterfield, Mass., and in Siberia, and these are also the best localities for rubellites and green tourmalines. The white come from St. Gothard, Siberia, and Elba. Black tourmalines and common varieties of the other colors occur in many parts of Europe and America, and the black is sometimes in such abundance as to form a large part of a rock called "schorl rock." Tourmaline becomes electrified by heat or friction with great readiness, and it has been supposed that the ancients were acquainted with this property. A slice cut from a tourmaline parallel to its axis forms a perfect analyzer for polarized light (see Polarization of Light), and this is its most valuable application. Tourmalines are seldom used in jewelry, though fine rubellites form beautiful gems and bear a high price. In the grand duke's collection at Florence there was a specimen 11 inches square, with 4 erect and one prostrate green tourmalines, 4, 2, and 2¼ inches long, and ¾ to 1 inch thick. In the British museum is a magnificent group of pink tourmalines nearly a foot square, given by the king of Burmah to Col. Sykes, while commissioner at his court. The tourmaline appears to have been first brought to Europe from Ceylon by the Dutch, about the end of the 17th century, and was exhibited as a curiosity, on account of its first attracting and then repelling light bodies when electrified by heating it. It was then considered as a sort of magnet, but appears to have been little known even down to the middle of the 18th century, as Linnæus, who was the first to refer its attractive power to electricity, had never seen one. In 1740 a specimen was worth 8 or 10 Dutch florins, or $3.28 to $4.10.

TOURNAMENT (It. *torniamento;* Fr. *tourner*, to turn), a military sport of the middle ages, in which the parties engaged exhibited their courage, prowess, and skill in arms. It took its rise after the establishment of the feudal system, and appears to have been introduced into northern Europe as early as the middle of the 9th century, although several centuries elapsed before it came into familiar or reputable use. This was owing perhaps to the costliness as well as the sanguinary character of the contests in the early tournaments, which often resulted in the death or serious injury of several of the combatants, and were conducted very much in the spirit of the gladiatorial shows of the ancient Romans. Hence the prohibition of the practice by such princes as Henry II. of England, and the steady opposition of the church from the middle of the 12th to the middle of the 13th century. With the institution of chivalry and knighthood the tournament lost many of its objectionable features; and as an incentive to martial exploits and to a generous emulation in all knightly offices, it began during the period of the crusades to be tolerated and even encouraged throughout Christendom. The church, which had prohibited persons from engaging in tournaments on pain of excommunication, and had denied Christian burial to such as lost their lives in them, finally relaxed its opposition, and until the latter part of the 15th century the sport continued in full activity. It thenceforth became gradually transformed into a court pageant, often of the most magnificent and costly description; but the tragical death of Henry II. of France at a tournament in 1559 occasioned its abolition in all parts of Europe, although for nearly a century later it continued to be occasionally revived at court festivities as a memento of the past rather than a subsisting and popular custom. The decay of chivalry, the introduction of firearms, and the gradual disuse of defensive armor, together with the rise of the commercial spirit and the new civilization thereby extended over the world, were the real causes of its decline. Whatever may have been the nature of the combats in tournaments at the origin of the practice, they soon became for the most part encounters between mounted adversaries (whence the derivation of the term, as illustrative of the agility required by the combatants in turning or managing their horses), who were knights or at least candidates for knighthood, as esquires or pages. A joust was, properly speaking, a combat between two knights, while the tournament included a number of jousts, or an encounter of several knights on a side.—In the course of time numerous regulations, having the authority of a code of laws, prescribed the manner in which tournaments should be conducted; and, except where national pride or rivalry, or personal enmity, inflamed the combatants, no serious result was likely to happen. They were generally held at the invitation of some prince upon the birth or nuptials of royal persons, during royal progresses, or at high court festivals, and heralds were sent into the neighboring kingdoms to invite the knights to be present. These, if the occasion was one of importance, came frequently from distant countries, attended by splendid retinues; and on the appointed day the galleries encircling the lists, or level enclosed space in which the knights contended, were gay with banners and costly draperies and crowded with spectators, conspicuous among whom were the ladies, whose approving smiles were the rewards most esteemed by the victors. In the flourishing period of tournaments two kinds of arms were employed, those expressly made for the purpose, consisting of lances with the points blunted, or covered with pieces of wood, called rockets, and swords blunted or rebated; and those ordinarily used in warfare, termed *armes à outrance*, which, however, in many cases were not permitted by the judges of the tournament. The blows, whether of lance or sword, were required to be directed at the head and breast, and no combatant was permitted to strike an adversary after he had raised his visor or to wound his horse. Each knight in attendance was obliged to prove his noble birth and rank, which were originally proclaimed by the heralds with sound of trumpet, whence the word blazonry, signifying the art of deciphering the heraldic devices on a coat of arms, from the German *blasen*, to blow. At a later period the emblazoned shields of the knights, suspended at the barriers or entrance of the lists, sufficed to indicate their rank and family. If upon the accusation of any lady present the bravery or loyalty of a knight was impeached, he was excluded by the heralds from the contest. The heralds having proclaimed the laws of the tournament, at the sound of the trumpet the whole body of knights, each with his attendant squire, entered the lists in a glittering cavalcade, distinguishable only by their emblazoned shields or by the favors of their mistresses—a still prouder bearing—suspended from their crests, after which preliminary spectacle the martial exercises of the tournament commenced. At the word of the heralds, *Laissez-aller*, the opposing combatants rode at each other in full career, striving to direct their lances fairly upon the helmet or shield of their adversaries, that one being adjudged the victor who broke most spears "as they ought to be broken," who held his seat the longest, and who showed most endurance in keeping his visor closed. Sometimes dismounted knights encountered each other with swords or axes. The heralds and attendant minstrels meanwhile animated the combatants by appeals to their gallantry and devotion, or by approving shouts at any unusual display of strength or skill, the ladies waved their scarfs, and the friends of individual knights shouted encouragement from the galleries. At the close of these animating combats, the prizes were announced by the judges, selected from the older knights, but were awarded by female hands. "Victory in a tournament," says Hallam, "was little less glorious, and perhaps at the moment more exquisitely felt, than in the field; since no battle could assemble such witnesses of valor. 'Honor to the sons of the brave!' resounded amid the din of martial music from the lips of the minstrels, as the conqueror advanced to receive the prize from his queen or his mistress; while the surrounding multitude acknowledged in his prowess of that day an augury of triumphs that might in more serious contests be blended with those of his country."—A favorite form of the tournament was the so called passage of arms, in which a party of knights, assuming the office of challengers, offered combat to all who dared oppose them. Of this, as also of the *mêlée* or encounter of bodies of knights attended by their squires, a splendid description is given in Scott's "Ivanhoe," which affords a more vivid idea of the tournament, with all its martial exercises, than the writings of Froissart or any other of the old chroniclers. The later tournaments were however harmless in comparison with such sanguinary encounters as these; and the combatants, while aping the forms and usages of chivalry, were so destitute of the old knightly spirit of their predecessors in the lists as to content themselves chiefly with an ostentatious display of magnificent equipments or of skilful horsemanship. A splendid festival in the form of a tournament was given by the earl of Eglinton at Eglinton castle, in the west of Scotland, in 1839, on which occasion many of the visitors assumed the character of ancient knights, and a queen of beauty awarded the prizes.

TOURNAY, or **TOURNAI** (Flem. *Doornik;* anc. *Turris Nerviorum*, afterward *Turnarum*), a frontier town of Belgium, in the province of Hainault, situated on both banks of the Scheldt, 28 m. W. N. W. from Mons and 45 m. W. S. W. from Brussels; pop. 33,000. The river is crossed by several fine bridges and lined by spacious quays, planted with shade trees, and used as promenades. The town is strongly fortified and defended by a citadel constructed by Vauban. It is entered by 7 gates, and consists of the old town, on the left bank of the river, and the new town, on the right. The former contains the cathedral, which is a large and beautiful edifice in the Gothic style, of great antiquity, ornamented externally by fine towers with spires, and in the interior by several sculptures in marble, fine paintings by Rubens, and ancient remains; but it was considerably defaced during the French revolution. There are several other churches, the most remarkable being that of St. Brice, with the tomb of King Childeric adjoining. The market place, near the cathedral, contains a belfry supposed to have been part of a castle erected in the 13th century. Tournay is the seat of extensive manufactures, which give employment to about ¾ of the inhabitants; the more important products are woollen and cotton cloth, hosiery, linen fabrics, camlets, various kinds of yarn, waistcoat patterns and other fancy articles of dress, carpets, for which Tournay is particularly famous, earthenware and porcelain, bronze goods and hardware, cutlery, hats, paper, and leather. There are numerous breweries, and distilleries where curaçoa and other liqueurs are made, salt refineries, and dyeing establishments. Vessels of about 150 tons burden can ascend the river to Tournay, and it is connected by railroads with all the chief towns of Belgium and France.—At the time of its conquest by Julius Cæsar, Tournay was one of the chief towns of the Nervii. During the middle ages it was one of the most important towns of Belgium; and in modern times it has frequently been besieged and taken in the various wars that have desolated this part of Europe.

TOURNEFORT, **JOSEPH PITTON DE**, a French botanist, born at Aix, Provence, June 5, 1656, died in Paris, Nov. 28, 1708. He received a classical education, was destined for the church, and entered a theological seminary; but after his father's death in 1677 he devoted himself to natural philosophy, in 1679 attended lectures in the medical school at Montpellier, afterward explored Languedoc, Roussillon, Catalonia, and the Pyrénées, and returning to Aix in 1681 began to classify the plants he had gathered. In 1683, being called to Paris by Fagon, physician of Louis XIV., he was appointed professor of botany in the *jardin des plantes*, and drew a large concourse to his lectures. In 1688 he visited Spain and Portugal, and a little later went to England and Holland, to gather plants. He was offered the professorship of botany at the university of Leipsic, which he declined; became a member of the academy of sciences in 1692, and took the degree of M.D. in 1698, when already 42 years of age, publishing as his thesis the *Histoire des plantes qui naissent aux environs de Paris, avec leur usage en médecine*, which was reprinted with annotations by Jussieu (2 vols. 12mo., Paris, 1725). He had already published his *Élémens de botanique, ou méthode pour connaître les plantes* (3 vols. 8vo., Paris, 1694), which he translated into Latin under the title of *Institutiones Rei Herbariæ* (3 vols. 4to., 1700), presenting a full exposition of his natural system of botany, several classifications of which have been preserved by Linnæus. In 1700 under Louis XIV. he visited the island of Candia, the archipelago, Constantinople, the southern shore of the Black sea, Armenia, Georgia, and the interior of Asia Minor, gathering in this tour no fewer than 1,356 new plants. These were classified according to his system, and included many new species, described in his *Corollarium Institutionum Rei Herbariæ* (1703). The general account of his journey, *Voyage du Levant*, which is considered a masterpiece in point of knowledge and interest, was printed at the expense of the government in 2 vols. 4to., the last being completed in 1717. It has been reprinted in 3 vols. 8vo.

TOURNIQUET (Fr. *tourner*, to turn), a surgical instrument for stopping the flow of blood in the limbs by exerting a strong compression on the principal artery. It was invented by Morel, a French surgeon, about the middle of the 17th century, and was modified subsequently by Nuck, Verduc, Monro, Petit, and Louis. Its usual form is that of a firm pad on the under surface of a brass plate, to which a strong band of webbing is attached, by means of which the limb can be ligatured, and a screw on the upper surface of the plate, which regulates at the same time the ligation and the pressure. So that the object desired, the compression of the artery, is attained, the form of the instrument is of but little consequence; a very effective tourniquet has often been extemporized by tying a knot in a handkerchief, and, having placed the knot over the artery, twisting the ends of the handkerchief with a stick. The tourniquet is of service in checking bleeding from a wounded artery in a limb, and for preventing its flow in amputation. It is also used, in some cases, to compress aneurismal and other tumors, with a view of producing coagulation or absorption; but at the present day other modes of compression are generally preferred for this purpose.

TOURO, Judah, an American philanthropist, of Jewish descent and faith, born in Newport, R. I., in 1775, died in New Orleans, Jan. 18, 1854. He removed to New Orleans in 1802, where he engaged in commercial enterprises, and also purchased much real estate. He accumulated a large fortune, and gave liberally through life to benevolent objects. In 1815 he served under Gen. Jackson in the defence of his adopted city, and was wounded in the battle. At his death he gave more than half of his property for charitable purposes. Among his bequests were $80,000 to found an almshouse in New Orleans; $65,000 to the 13 Hebrew congregations of that city; $20,000 to the New York Jews' hospital; to the relief society for indigent Jews in Palestine, $10,000, and for ameliorating the condition of the Jews in the Holy Land, $50,000; to each of the Hebrew congregations in Boston, Hartford, New Haven, Newport, New York, Charleston, and Savannah, $5,000; to the female asylum and boys' asylum in Boston, each $5,000; and to the Massachusetts female hospital, $10,000. At the period of his death he had no known living relatives.

TOURS (anc. *Cæsarodunum*), a walled town of France, capital of the department of Indre-et-Loire, situated on a flat tongue of land between the Loire and its tributary the Cher, 120 m. S. S. W. from Paris; pop. in 1856, 33,204. The Loire is crossed by a handsome bridge of 15 arches. The town is of oblong form, and lies parallel to the river, the banks of which are lined by a fine quay with handsome houses and well planted promenades. A great number of the houses are modern, and several of the streets are well laid out, the principal one extending the whole length of the town, and having at one end a statue of Descartes, who was born in the vicinity. The cathedral of St. Gatien is 256 feet long and 85 feet wide in the interior, and is highly ornamented. The W. front is flanked by 2 domed towers 205 feet high, and has 3 lofty portals surmounted by a window of extraordinary dimensions. It contains, among other objects of great interest, a fine marble monument of the children of Charles VIII. and Anne of Brittany. There are several churches and ancient edifices. The church of St. Julian, built in the 13th century, now used as a coach house, is a fine pointed edifice; and 2 circular towers, enclosed within the cavalry barracks, formed part of the castle built here by Henry II. of England. The *hôtel de ville* contains a public library of 40,000 volumes and several remarkable MSS. The archiepiscopal palace is one of the finest buildings of the kind in France. There are several public walks, a race course, and a botanical garden. The most important manufacture is silk, which was established here earlier than in any other part of France by workmen brought from Italy in the 15th century. In the 16th century 20,000 hands were employed in this branch of industry, but the competition of Lyons, where the climate is more favorable to the silkworm, has reduced the number considerably. Broadcloth, rugs, woollen yarn, starch, leather, wax candles, and some wine and brandy are also manufactured.—Tours was anciently the capital of the Gallic tribe of the Turones, afterward of a division of Gaul under the Romans, and later of Touraine. It had a population of 80,000 when the revocation of the edict of Nantes deprived it of nearly all its industry and almost all its inhabitants, and from this loss it has never recovered.

TOURVILLE, Anne Hilarion de Cotentin, count de, a French naval officer, born at Tourville, arrondissement of Coutances, Normandy, in 1642, died in Paris, May 28, 1701. The son of a general in the army, he entered the order of Malta when only 14 years old, and early distinguished himself by bravery and talent in naval forays or *caravanes* against the pirates of northern Africa. So great was the fame of the young knight that the republic of Venice gave him a gold medal and chain, with the title of protector of maritime commerce; and on his return to France in 1667, Louis XIV. welcomed him at Versailles and gave him a captaincy with the command of a ship. In that capacity he participated in the expedition led by the duke of Beaufort against Candia in 1669; then served under D'Estrées in the war against Holland, and assisted in the battle of South Bay, June 7, 1672. In 1675 he was sent, with the chevalier de Valbelle, to support the inhabitants of Messina in their rebellion against Spain; and he greatly contributed, under Duquesne, to the victory of Agosta, April 22, 1676, in which the celebrated Dutch admiral De Ruyter was mortally wounded, and thus gained his promotion to the rank of chief of squadron or commodore. Off Palermo, May 31, 1677, by a timely attack, he nearly destroyed the combined fleets of Spain and Holland. In 1682 he shared in the attacks of Duquesne against Algiers; then in the bombardment of Genoa in 1683, and was made a lieutenant-general of marines. In 1688 he again bombarded Algiers, and was nominated "vice-admiral of the Levant." In the war against William III. of England, he united the Mediterranean fleet with that of Admiral Château-Regnault, and with him fought the English and Dutch fleets off Beachy Head, July 20, 1690, pursuing the former to the mouth of the Thames, where he destroyed 12 ships and many transports. In 1691, being appointed to the command of the ocean fleet, he annoyed the English, and, keeping the channel clear, favored the sending of French troops to Ireland in aid of James II. The next year, by positive order from Louis XIV., at the head of only 44 ships, he engaged off Cape La Hogue the English admiral Russell, whose forces were nearly double, and, after 12 hours of determined resistance, succeeded in escaping to port with the remains of his fleet. Promoted to a marshalship, March 27, 1693, he sailed from Brest, met off Cape St. Vincent the English and Dutch fleets convoying a large number of merchantmen bound to the Mediterranean, attacked them, and captured 27 vessels and destroyed 59, inflicting an immense loss on the enemy. On the peace of Ryswick in 1697, he retired to private life. His *Mémoires* (3 vols. 12mo., 1743-'58), by some unknown writer, are worthless.

TOUSSAINT, Anna Luize Geertruide, a Dutch novelist, born in Alkmaar, Sept. 16, 1812. She first appeared as an author in 1827 with the romance of *Almagro*, which was succeeded by *De Graaf van Devonshire* (1838) and *De Engelsche in Rom* (1840). These works met with success, and were followed by *Het Huis Lauernesse* (2 vols., 1841), a historical romance of the time of the reformation, which gave her a European reputation. It was followed by her works on the life and fortunes of the earl of Leicester, entitled *Leycester en Nederland*, *De Vrouwen van het Leycester'sche Tijdperk*, and *Gideon Florenz* (9 vols., 1851-'4). In 1845 her native village conferred upon her civil rights. In 1851 she married the painter Bosboom.

TOUSSAINT, François Dominique, surnamed L'Ouverture, a Haytian general, born near Cape St. François in 1743, died in the dungeon of St. Joux, France, April 27, 1803. His parents were both slaves, and of pure negro blood. His father was a native of Africa, and was said to be a son of a chief or king; he had been sold by the slave dealers to the count de Noé, upon whose estate of Breda he was employed. Upon this estate Toussaint was born, and during his youth was known as Toussaint Breda, and sometimes from his extreme slenderness as Fatras Baton, or "little lath." The director of the count de Noé's estate, M. Bayou de Libertas, was a mild and amiable man; and perceiving that Toussaint, who had been employed as a herdsman, was intelligent and faithful, he made him his coachman, and finally gave him a post of importance and trust in connection with the sugar manufactory of the estate. He had learned to read and write a little from a fellow slave, and on his promotion he endeavored to cultivate his mind by further study and reading. It is said that the abbé Raynal's "Political and Philosophical History of the European Colonies in the East and West Indies" fell into his hands, and that its pictures of the evil results of slavery had a powerful effect on him. It is certain, however, that he remained apparently contented with his lot till near his 50th year. When in 1791 the mulattoes, who had demanded a share in the representation and offices of the government from the whites, and had been maltreated and murdered by order of the colonial government, appealed to the negroes for help in enforcing their rights, though many of the blacks rose in insurrection and destroyed one third of the dwellings in the northern departments, Toussaint incurred the hostility of his race by remaining quiet and faithful. It was not until he had secured the escape of the director of the estate, M. Bayou, with his family and what personal property he could carry with him, that he united with the negro army. It was at that time commanded by 3 generals: Jean François, intelligent, but of no great courage or enterprise; Biassou, vindictive, fierce, and violent; and Jeannot, cowardly and cruel, who was soon after executed by his associates. Toussaint, at first employed in a medical capacity, to which his knowledge of the medicinal properties of plants gave him some claim, was soon appointed brigadier-general; and though averse to cruelty, yet having more confidence in the military ability of Biassou than that of Jean François, he became a member of the staff of the former when the two quarrelled. The black leaders were naturally inclined to a monarchy, and when news came of the beheading of Louis XVI. they, and Toussaint with them, accepted the proffered aid of the king of Spain, and repelled the offers of republicanism of the French convention. He soon distinguished himself by the capture of the entire army of Brandicourt, the general of the whites, without bloodshed, and as a result of this capture took possession of Dondon, an important military post. He followed this on July 27, 1795, by the capture of Marmelade, another important post, the defeat of the French colonel Desfourneaux, and the seizure of Ennery and Gonaives. The English now invaded the island and took Port au Prince, while the French, the Spaniards, the mulattoes, and the blacks were all contending with each other, in a purposeless but sanguinary strife. It was at this juncture that Toussaint, who was already in effect the commander-in-chief of the black forces, and who had entered upon the war with the sole purpose of securing the freedom of his race, became convinced that the only hope of obtaining that freedom lay in declaring for France, whose national legislature had, while making Hayti an integral part of France, proclaimed also the freedom of all the slaves. Spain, with which, prompted by his preferences for a monarchy, he had hitherto acted, evidently meant to perpetuate slavery; England had but a slight foothold in the island, and the mulattoes had no organization. If the power of France were once established, freedom and equality might prevail in Hayti. Deeming his duty to his race the one of highest obligation, he declared his fealty to France, and applied himself so energetically to bring all parties to the same conclusion that Laveaux, the French commander, exclaimed: *Mais cet homme fait ouverture partout;* and from this time he received his surname of "L'Ouverture" (the opening). He formed a junction with Laveaux, and, though the Spanish and English forces united against him, entered upon the campaign with such energy that he drove the English from nearly all their strong positions, took 28 Spanish batteries in 4 days, maintained a long line of defences against the allied enemy, who possessed twice his force, rescued Laveaux from the hands of Rigaud, the mulatto leader, who had imprisoned him, besieged St. Marc, where the English were in greatest force, 3 times, twice captured Mirebalais out of the hands of the allies, and finally closed the campaign by receiving the capitulation of the entire English force at St. Marc, and the abandonment of the effort by the Spanish to conquer the W. portion of the island. Appointed commander-in-chief of St. Domingo in 1796 by Sonthonax, the French commissioner, Toussaint sought to restore order and industry to the island, and was successful, though opposed by Hédouville, the new commissioner, who, finding his own influence waning as that of Toussaint rose, fled to France to make complaint of the negro chieftain, who sent to the directory a statement of the true position of affairs. The French directory justified Toussaint and censured Hédouville. But the latter, on the eve of leaving Hayti, had purposely sown the seeds of discord between Rigaud, the jealous mulatto leader, and Toussaint, and had, by finally setting the former free from his obligations to the latter, prepared the foundations of a new civil war. Rigaud was able and daring, and for nearly the whole of the year 1799 the war between the blacks and the mixed race raged fiercely. The capture of Jacmel by Toussaint, after a long siege, was a severe blow to Rigaud; and subsequent successes of the black chief completely subdued the mulatto insurrection, and Rigaud with some of his officers fled to France. Roume, the French commissioner who had succeeded Hédouville, attempting to countenance the slave trade, and in other ways showing himself a traitor to Hayti and to France, Toussaint arrested and imprisoned him, and subsequently sent him to France, and took possession of the eastern end of the island, which had till then remained in allegiance to Spain. On Nov. 26, 1800, he assumed the government, amenable for his administration to the French directory alone; and in Jan. 1801, the whole island became subject to his sway. Understanding thoroughly the people whom he was to govern, he took measures to restore industry, to remove prejudices, and to establish good order. He invited the steward of his old master's estate and other well disposed white colonists back to the island, and soon agriculture was actively resumed and the laborers were busy in gathering their harvests. Whether from the love of display inherent in his race, or from his knowledge of its effect upon the blacks, he assumed great state in his public appearance, being richly attired and surrounded by a guard of 1,500 to 1,800 men, all in brilliant uniforms and admirably mounted. In private life, however, he was plain and temperate even to abstemiousness. At the very beginning of his administration Toussaint selected an administrative council of 9, of whom 8 were white proprietors and one a mulatto, all men of probity and intelligence. He also determined upon the adoption of a constitutional government; and in the constitution drawn up by the council, which was in most respects an admirable document, he was named president for life, and free trade was established. This constitution he sent with a letter to Bonaparte, then first consul, on July 16, 1801. It reached France at an unfortunate epoch. The peace of Amiens had closed the wars which had given employment to the armies of France, and there was a large body of men among them ready to oppose the ambitious designs of the first consul, of whom it was necessary for him to rid himself. The freedom of the black race in Hayti lent him no renown, since it was accomplished without his aid, while its reenslavement would gratify the colonists who were besieging the French court. The comparisons which were already drawn between the black and the white military hero, too, excited his animosity; and in the adoption of a constitution and the assumption of the office of president for life, without any previous suggestion from Bonaparte, the negro chieftain had unwittingly committed an unpardonable offence. Hence, when Vincent, the messenger of Toussaint, presented the constitution to the first consul, his instant reply was: "He is a revolted slave whom we must punish; the honor of France is outraged." An act was passed by the council and a decree issued by Bonaparte to restore the French colonies to their condition previous to 1789, that is, to the condition of slavery, and of course to put down Toussaint. In a subsequent decree St. Domingo or Hayti was excepted—an exception, as the event proved, intended to be only temporary. Gen. Leclerc, the husband of Pauline, Bonaparte's sister, was accordingly sent out with a force of 30,000 men, mostly veteran soldiers, and 66 war vessels. The expedition sailed in Nov. 1801, and arrived on the coast of Hayti in Jan. 1802. Among those in command in it were Rigaud, Pétion, and Boyer, all enemies of Toussaint. No declaration of war was made, but Leclerc attempted to enter Cape François with his force, and was opposed by Christophe, who was in command there, and who asked for a delay of two days, that he might consult with Toussaint. This was refused, and half an hour contemptuously allowed, when, rather than surrender, Christophe burned the city. Finding unexpected resistance at all points, Leclerc sent Toussaint's sons, who had been educated in France, and whom he had brought with him, hoping by their means to cajole the negro chief into submission, to their father, with a letter from Bonaparte and another from himself, couched in terms of mingled flattery and menace. The negotiation was ineffectual; though tenderly attached to his sons, Toussaint refused to sacrifice his country for them. Leclerc then declared him and his generals outlaws, and a sanguinary conflict ensued, in which one third of the French troops were killed or wounded; and though they possessed the seaports, yet the blacks from their mountain fastnesses were destroying them in detail. Finding that it was impossible to conquer the island in this way, Leclerc next sought to win over the negro generals. He began with Christophe, and by protestations that the freedom of the blacks was established, and that there was no object in the war, and by the lure of honors to be conferred on him in person, he succeeded in winning him to his interest, and Dessalines and his other generals soon followed. He next made his propositions to Toussaint, offering as conditions of peace to respect the liberty of the people of St. Domingo, and confirming this by the most solemn oaths to leave the government of the island in Toussaint's hands, and to employ the officers of his army according to their rank, while for himself he would only hold the office of delegate from France by Toussaint's side. Toussaint, won by his apparent candor and liberality, accepted his offers to the people and army, but avowed his own determination to live in retirement. In the interview which followed, Toussaint upbraided Leclerc severely for the ruin he had brought upon Hayti, by his attacks upon him and his forces, without first seeking an interview. With affected humility, Leclerc acknowledged his fault, and was loud in his praises of the generalship and ability of the negro chief. Toussaint retired to his estate near Ennery, and endeavored amid arts of peace to banish from the minds of all around him the remembrance of the wars which had passed. But Leclerc, prompted by Bonaparte, had determined upon his destruction. Finding no occasion of reproach in his conduct, he had resort to deception to get him into his power, and at his direction Gen. Brunet on June 7 sent him an apparently cordial letter, asking for an interview of an hour in relation to some arrangements for providing for the black troops, inviting him to bring his wife with him, and closing with assuring him of the sincerity of his friendship. Suspecting no evil, Toussaint went as requested to Gonaives, and after a short conversation Brunet left the room, when an armed force entered and seized him, and at midnight put him on board a French frigate. His family were also seized and sent on board the same vessel, and his house was plundered. They were at once sent to France, and on their passage Toussaint addressed two most touching letters to the first consul and the minister of marine, asking that his family might be protected. Arrived at Brest, an officer of police was sent, at 5 o'clock in the morning, to transfer him from the vessel. He was compelled to leave his family, which he was never allowed to see again, and permitted to take only his servant, who a few months later was also taken from him. On Aug. 17, 1802, he reached Paris under guard, and was at once confined in the Temple, from whence he was transferred, without trial, and without being allowed any interview with Bonaparte or his ministers, without even any explanation of the cause of his arrest, to the dungeons of the castle of Joux, in the department of Doubs. Here, deprived of all society, subjected to the intense cold with insufficient clothing, and his food reduced below what the physicians pronounced sufficient to sustain life, the heroic old man struggled against his fate, and appealed repeatedly but in vain for a trial. The first consul sent his aid Caffarelli to demand where he had buried his money. Toussaint only replied: "I have lost something very different from money." Finding that his appeals for a trial produced no response, he commenced, as well as his failing strength would allow, his defence, which was transmitted to Bonaparte, but elicited no reply. His death by starvation was determined upon, and his pittance of food reduced; and finally the governor of the castle went away for 4 days and left Toussaint without food or drink. On his return he was dead, and the rats had gnawed his feet. An autopsy was held, and his death was said to have been caused by apoplexy. Several memoirs of Toussaint have been published. Among them are: *Histoire de l'expédition des Français à Saint Dominique*, by Metral (Paris, 1825); *Sur l'expédition des Français sous le consulat de Bonaparte*, by Isaac Toussaint L'Ouverture (Paris, 1825); *Histoire de l'île d'Hayti*, by Placide Justine (Paris, 1826); *Vie de Toussaint L'Ouverture*, by Saint-Rémy (Paris, 1850); "The Life of Toussaint L'Ouverture," by the Rev. John R. Beard, D.D. (London, 1853).

TOWN (Ang. Sax. *tun*, from *tinan*, to enclose), in Great Britain, an assemblage of houses, usually having a market, or a subdivision of a county. In early times the name was applied only to such collections of houses as were surrounded by a wall. Sir Edward Coke says that a place cannot be a *vill* (or town) unless it hath, or in times past hath had, a church and celebration of divine service, sacraments, and burials. Sir John Holt says that a *vill* or town must have a constable, and that otherwise it is only a hamlet, an assemblage of houses having no specific legal character. In England, however large a town may be, it cannot become a city unless it is or has been the see of a bishop, and has a cathedral; thus Birmingham, with nearly 300,000 inhabitants, is only a town, while Lichfield, with fewer than 7,000, is a city.—In New England, from its first settlement, the town was the primary organization, and seems to have been based on the old Saxon idea of a tithing. The colonists had no sooner formed a settlement, and erected their cabins in convenient proximity to each other, than they organized themselves into a town, an independent municipality, in which every citizen had a voice and vote. The territory claimed by these towns might be large or small, but each was an independent and self-governing democracy, and the voters were equal in the town meeting. In some of these towns there were restrictions on the admission to citizenship; thus in New Haven, or Quinnipiack, and the towns which afterward affiliated with it, no man could vote in town meeting who was not a member of the church; and in the towns of the Massachusetts colony, as in most of the others, the possession of a certain amount of property was necessary to the exercise of the right of suffrage. The citizens in town meeting assembled had the control of all matters relative to civil and criminal jurisdiction in the town; its finances, roads and bridges, support of its poor, and with some exceptions its public schools, were ordered and maintained by the town. The representatives of the town authority in all these matters, except the school supervision, were the selectmen, 3, 5, 7, or 9 in number, whose chairman, usually called the first selectman, was the executive officer of the town. In the colonial governments, and to a considerable extent under the state governments, the town was the primary assemblage of the state. In the New England colonies the towns were combined in counties long after their establishment and representation as towns, so that the county there was a collection of towns, rather than the town a subdivision of the county. This system of town organizations is maintained throughout New England to the present day. The management of their local affairs, the support of the poor, the police regulations, the control of the schools, and the maintenance of roads and bridges, are all within the scope of the town authorities; and in all the New England states except Massachusetts and Maine, in which the district system has been adopted within 30 years, every town is represented in the lower house of the legislature. Mr. Palfrey, in his "History of New England," says that "with something of the same propriety with which the nation may be said to be a confederacy of republics called states, each New England state may be described as a confederacy of minor republics called towns."—In the other colonies, and the states formed since the revolution, the town organization has not been so prominent. The *wycks* of the early Dutch administration, and the townships of later times, in the colony of New York, were mostly the properties of great landed proprietors, occupied by a kind of feudal tenure by their tenants; and when, after the organization of a state government, the lands were sold to actual settlers, the county organization generally, and perhaps always, preceded that of the town. Occasionally borough or municipal charters were granted by the state legislature, conferring upon certain small districts of territory powers nearly analogous to those of a New England town; but except in these it had no representative in New York or most of the middle or western states. Recently the control of the public schools has been conferred upon the townships, and in the new states the gift of a section of land for school purposes to each township has thrown upon the town authorities some duties which do not appertain to them in some of the older states. All of the newer states of the West and North-West are surveyed in townships, usually of 6 miles square; but this survey carries with it no local political authority. In the southern states there are no townships. The county organization is the one which governs local matters, except in cities or boroughs specially chartered. A town there is simply a collection of dwellings of greater or less size, and in a majority of cases there is but one in a county (and not always even one), which has gathered around the site of the county buildings.—The towns of antiquity were usually colonies from some enterprising and commercial state, which by purchase or conquest, more frequently the latter, had obtained foothold upon a territory, and there established themselves in the pursuit of agriculture, commerce, or the arts. They frequently held sway over a considerable adjacent territory, and were sometimes independent, oftener tributary to some great power, and sometimes ruled by a governor, prætor, or proconsul of Rome or other dominant empire. In the middle ages there sprang up a considerable number of free or independent cities and towns on the continent of Europe, which often allied themselves together for mutual protection. (See HANSEATIC LEAGUE.)

TOWNE, a new N. E. co. of Georgia, bordering on North Carolina, and drained by the head streams of the Hiawassee river; area, about 250 sq. m.; pop. in 1860, 2,459, of whom 108 were slaves. The surface is hilly and mountainous, and the soil generally fertile. Capital, Hiawassee.

TOWNLEY, CHARLES, an English collector of works of ancient art, born in Lancashire in 1737, died in 1805. Being of a Roman Catholic family, he received his education abroad; and during a residence in Rome between 1765 and 1772 he devoted a large portion of his private fortune to the purchase of ancient marbles, terra cottas, bronzes, gems, &c., in which he was aided by the advice and experience of Winckelmann and other competent judges. After his return to England, he continued to add to his collection by means of agents at Rome, and by the purchase of the collection formed by Nollekens, as also of such desirable specimens as were offered for sale in England. After his death his collection of marbles and bronzes was purchased by the nation for £20,000, and in 1814 his bronzes, coins, and gems became the public property at a cost of £8,200. The whole collection was deposited in the British museum, and until the erection of the present building the marbles occupied a special suite of rooms called the Townley gallery. They are now incorporated with the general collection of Græco-Roman remains, of which, both as regards extent and character, they form the most important part. They belong to all periods of ancient art except the earliest; and the best specimens are either original works by Greek artists, executed in the early times of the Roman empire, or copies of works by celebrated early Greek masters. The most remarkable of these are the Venus or Dione, found in the baths of Claudius at Ostia in 1796, the *Discobolus* or quoit thrower, supposed to be a copy of the famous bronze statue by Myron; the well known "Drunken Faun," and other statues; two colossal busts of Pallas and two of Hercules; portrait busts of Homer, Periander, Pindar, Sophocles, Hippocrates, Epicurus, and Pericles; and the exquisite female head rising from the petals of a water lily, known as the Clytie, of which numerous repetitions have been made in plaster and marble. The bassreliefs are fine, and include Achilles, the Muses, and a graceful figure of a Bacchante.

TOWNSHEND, CHARLES, second viscount, an English statesman, born in 1676, died in Rainham, Norfolk, June 21, 1738. He succeeded to his title at 10 years of age, and soon after taking his seat in the house of peers attached himself to the whigs, to whose principles he remained faithful during his whole career. In 1705 he was appointed one of the commissioners to treat for the union with Scotland, and in 1707 captain of the yeomen of the queen's guard; and in 1709, in the capacity of ambassador extraordinary to the United Provinces, he concluded the barrier treaty, for which he was denounced in the house of commons in 1712 as an "enemy to the queen and kingdom." The accession of George I. having brought the whigs into power, Townshend was appointed one of the principal secretaries of state, and took the lead in the administration until the summer of 1716, when, owing to the intrigues of his colleagues in the ministry, Lord Sunderland and Gen. Stanhope, he was dismissed from office. To break the ignominy of his fall, he was offered the lord-lieutenancy of Ireland, which he indignantly declined; but the king, fearful of the effect of his dismissal upon the public mind, prevailed upon him to accept the office, promising that it should soon be exchanged for a more influential one. The growing influence of Sunderland and Stanhope with the king, however, rendered the position of Townshend an uncomfortable one, and, with his colleague and brother-in-law Walpole, he retired from office in April, 1717. After remaining for several years in opposition, he was in 1720 appointed president of the council, and upon the reconstruction of the ministry in 1721 he resumed his old position of secretary of state, Walpole becoming first lord of the treasury and chancellor of the exchequer. For several years the two ministers coöperated harmoniously in their administrative duties; but the growing ascendency of Walpole gradually excited the jealousy of Townshend to such a degree, that almost every question of public policy entertained by the government became the subject of a dispute between them. Finally, after an unusually angry interview, in which they are said to have proceeded to blows, Townshend resigned office on May 15, 1730, and, retiring to his seat at Rainham, devoted the remainder of his life to rural pursuits. Among the improvements which he promoted in agriculture was the introduction of the turnip husbandry. He was a man of ability, though an indifferent speaker, and left office, says Lord Mahon, "with a most unblemished character, and—what is still less common—a most patriotic moderation." He was somewhat overbearing in manners, and of an impetuous and irascible temper. —Charles, an English statesman, grandson of the preceding, born Aug. 28, 1725, died Sept. 4, 1767. He displayed in youth great quickness of conception, but, as in after life, was remarkable for unsteadiness of purpose and defiance of discipline. He entered parliament in 1747 as member for Yarmouth, for which place he sat until 1761, when he was elected for Harwich, and in 1753 brought himself into notice by a speech of great power and eloquence on the marriage bill. In 1754 he was appointed a lord of the admiralty, and in the first administration of Pitt he held the office of treasurer of the chamber, which in 1761 he exchanged for that of secretary of war. During the ministry of the earl of Bute he remained out of office, but in that of George Grenville which succeeded, he was appointed first lord of trade and the plantations. He zealously supported Grenville's stamp act, introduced in 1765, in a speech which elicited from Col. Barré in reply one of the most memorable efforts of parliamentary eloquence; but during the Rockingham administration, in which he held the office of paymaster of the forces, he advocated the repeal of the act. Upon the formation of the second Pitt administration in 1766, he became chancellor of the exchequer, and, with a vacillation of policy which gained him the name of the weathercock, advocated the necessity of a tax being laid upon American ports. On June 2, 1767, he introduced into the house of commons the celebrated resolutions imposing duties upon paper, tea, and other articles imported into the American colonies, which eventually led to their revolt and independence. The illness of Pitt, now earl of Chatham, and the consistent opponent of American taxation, rendered necessary a reconstruction of the cabinet, and Townshend was generally understood to have been selected to form a new ministry. But just as the prize seemed within his reach, he was carried off suddenly by a putrid fever. His parliamentary abilities and oratorical powers have been forcibly illustrated in a memorable passage in Burke's speech on American taxation, in which he is described as "that prodigy, Charles Townshend, the delight and ornament of this house and the charm of every private society which he honored with his presence."

TOWNSHIP. See Town, and Surveying.

TOWSON, Nathan, an American soldier, born in Maryland in 1784, died in Washington, D. C., July 20, 1854. He was appointed a captain in the 2d regiment of artillery in March, 1812, and on Oct. 8 of that year, aided by Lieut. Elliot of the navy, captured the British brig Caledonia, under the guns of Fort Erie. He was wounded in 1813 at Fort George, Upper Canada; and in 1814, being in command of a battery in Gen. Brown's army, which crossed to the Canada shore, he greatly distinguished himself for bravery and efficiency, driving the advance guard of Gen. Riall back beyond Black creek. In the battle of Chippewa he again led the van, and in the severe battle of Niagara for the third time received the highest commendation for his gallant conduct. In the defence of Erie on Aug. 15 he still further distinguished himself. In May, 1816, he was promoted to a lieutenant-colonelcy by brevet, and in 1819 appointed paymaster-general. In 1834 he received the brevet of brigadier-general, and in 1849 that of major-general, for meritorious services in the Mexican war.

TOXICOLOGY. See Poison.

TOXODON (Gr. τοξον, a bow, and οδους, a tooth), a name applied by Owen to a genus of extinct mammals of the order of pachyderms, with affinities to edentates and rodents. The first species, named by Owen the *T. Platensis*, was found in a miocene clay in South America, about 120 m. N. W. from Montevideo; it was established on a cranium 2½ feet long, elongated, with a flattened occiput, small cerebral cavity, remarkably strong and widely expanded zygomatic arches, and transverse glenoid cavity; the upper molars were 7 in number on each side, implanted with the convexity outward, the opposite of what occurs in rodents; they were long, arched, without roots, the enamel forming an irregular prismatic grooved tube; upper incisors 4, the external the largest, like those of rodents in structure, and worn away in the same chisel shape; in the lower jaw were 7 molars on a side, and 6 incisors ranged in a semicircle; the name was derived from the curve of the outer upper incisors. It was an animal of large size, low on the legs, with the aspect and habits of a pachyderm. Resembling the rodents in the form of the incisors, it differs from them in their number, in the shape of the skull, and in the transverse glenoid cavity; it shows an affinity to the aquatic pachyderms (like the manatee) in the flattened occiput, small brain cavity, and nasal passages widely opened above, but differs in the size of the frontal sinuses and in the incisors; its heavy form and its molars bring to mind the gigantic fossil edentates, from which the incisors distinguish it; it seems to have been an animal connecting the pachyderms with the rodents. The depth of the zygomatic arches indicates the great size of the temporal muscles acting on the large incisors, probably used, like the canines of the hippopotamus, in dividing and pulling up the roots and stems of aquatic plants growing on the banks of rivers; it was probably aquatic in its habits to a certain extent. For a detailed account of the genus, see "Fossil Mammals of the Voyage of the Beagle," described and figured by Prof. Owen (4to., London, 1840).

TRACERY, in architecture, the ornamental pattern work traced in the head of a Gothic window by causing the mullions to diverge into various fanciful shapes, enriched with foliations. The tracery of windows, as also of battlements or parapets, is perforated for the purpose of admitting the light, whence it is sometimes called open-work. When work of this character is applied to ceiling or panellings, it merely represents a pattern carved on a solid surface in the nature of bass-relief.

TRACHEOTOMY, a surgical operation by which the trachea or windpipe is opened. Tracheotomy may be performed with propriety in those cases where, from disease of the larynx, or upper portion of the air passages, such as croup, acute laryngitis, œdema, glottidis, quinsy, pressure from tumors or other causes, and diphtheria, the admission of air into the lungs is obstructed, and there is danger of suffocation. It may also be proper where some foreign body has become so fixed in the air passages as to completely obstruct the transmission of air through the trachea; and it has sometimes been tried with success to facilitate the inflation of the lungs in cases of suspended animation. The operation is not free from danger, and in the first class of cases, though giving marked temporary relief, it does nothing toward curing the disease itself. It consists in first making an incision in the median line of the throat, either below or above the thyroid gland, and dissecting down to the trachea, cautiously pushing aside the sterno-hyoid muscles and vessels lying in the vicinity, till the trachea is exposed. When the bleeding has ceased, the trachea is opened by a vertical incision, and a portion of one or more of its rings removed; through the opening thus made, a silver canula is introduced, which when obstructed by mucus may be removed, cleansed, and again inserted. If the obstruction to respiration is removed, the canula may be withdrawn and the orifice allowed to heal; but if not, the canula must be worn for life. If the operation is performed to aid in restoring animation or to remove a foreign body, no canula need be inserted, and the wound should be closed so soon as the object is effected.

TRACHYTE (Gr. τραχυς, rough), a rock of volcanic origin, named from the roughness of its surface. It consists chiefly of glassy feldspar, sometimes associated with hornblende, and also with augite. When these minerals predominate, the rock passes into the varieties of trap called basalt, greenstone, dolerite, &c.

TRACT AND PUBLICATION SOCIETIES. The practice of printing short religious treatises, essays, and narratives for cheap or gratuitous distribution was very early adopted. Indeed, prior to the introduction of printing, Wycliffe circulated his views by means of brief essays, which were passed from hand to hand, and often transcribed by those who were anxious to preserve them. Strype testifies to the circulation of some of Tyndale's tracts about 1530. In the 17th century there were some associations for printing and promoting the sale of religious works. In 1701 the "Society for Promoting Christian Knowledge" was founded, and its objects were declared to be: "1, to promote and encourage the erecting of charity schools in all parts of England and Wales; 2, to disperse both at home and abroad Bibles and tracts of religion, and in general to advance the honor of God and the good of mankind by promoting Christian knowledge, both at home and in other parts of the world, by the best methods that should offer." This society, which by its regulations was confined to members of the church of England, promoted from the first the circulation of large numbers of small books and tracts among the poor and vicious. In 1742 John Wesley began the publication and distribution of tracts and books on a large scale, and was the first to set the example of modern cheap prices sustained by large sales. In 1782 he and Dr. Coke organized the "Society for the Distribution of Tracts among the Poor." In 1750 the "Society for Promoting Religious Knowledge among the Poor" was organized at London, and was the first publishing society in which members of different religious denominations were united for the promotion of the circulation of religious books and tracts. In 1756 societies were established at Edinburgh and Glasgow for similar objects, and for several years circulated many religious publications; but eventually they as well as the London society declined and became inefficient. In 1795 Miss Hannah More commenced at Bath a series of small religious publications which she named "Cheap Repository Tracts," of which 2,000,000 were sold the first year. Among them was the widely popular story of "The Shepherd of Salisbury Plain." Mrs. Rebecca Wilkinson, of Clapham, Surrey, also wrote and published many small books and tracts. The philanthropic society printed for her in the course of a few years, commencing with 1792, 440,250 copies of books and tracts.—In 1793 the "Religious Tract Society," or as it is now called the "Religious Tract and Book Society of Scotland," was instituted. The Rev. John Campbell was its founder, and was led to establish it by his observation of the efforts of the Rev. Charles Simeon of Cambridge in that direction, and by some experiments he had made in issuing a few tracts for circulation himself. In 1855 this society adopted with some modifications the colportage system of the American tract society, and has since prosecuted it with great success. Its expenditures for colportage and gratuitous tract distribution in 1861 were £768 8*s.* 10*d.* The amount of its sales we have not been able to ascertain.—The "Religious Tract Society" of London was founded in May, 1799. It had its origin in the labors of the Rev. George Burder, minister of a congregation at Coventry, who had commenced printing tracts on his own account in 1781, of a more directly religious character than those of Miss More. He continued their occasional issue in connection with some friends for several years, intrusting the charge of their publication to a London bookseller, who eventually failed and caused the authors of the tracts considerable loss. Mr. Burder, believing that a more extensive agency and a larger investment were desirable, then convened a meeting of ministers by whom the society was established under its present name. Among its founders, beside Mr. Burder, were the Rev. Messrs. Rowland Hill, William Newman, Matthew Wilks, and Joseph Hughes, for many years its secretary. Its entire receipts the first year were £467 7*s.* 4*d.*, of which £203 10*s.* 8*d.* was from contributions, &c., and £263 16*s.* 8*d.* from sales. In 1849 they had risen to £50,981 15*s.* 8*d.*, of which £4,939 2*s.* 8*d.* was from contributions, &c., and £44,603 16*s.* 6*d.* from sales. The total receipts of 50 years from contributions and legacies, up to 1849, were £152,552 8*s.*, from sales £1,028,215 13*s.* 1*d.*, making with other items £1,202,242 13*s.* 8*d.* By the expenditure of this sum the society had published 5,148 different works in 110 languages and dialects, of which it had issued over 500,000,000 copies. It now keeps in stock 6,780 different publications suited for circulation and distribution, of which 701 are books for adults, 1,263 books for the young, 2,122 tracts, and 6 periodicals, and the remainder cards, handbills, &c.; and it issued in 1861 41,883,921 copies of volumes and tracts. Its total receipts the same year were £103,127 16*s.* 11*d.*, of which £14,437 12*s.* 8*d.* was from contributions and legacies, and £88,690 4*s.* 3*d.* from sales. The whole number of volumes and tracts issued from its organization to March 31, 1861, was 912,000,000, and the whole number of publications was 7,983, in 114 different languages and dialects. Its grants for 1861 of books, tracts, and money, amounted to £12,453 11*s.* 8*d.* This society owns no presses or bindery, the manufacture of its books and tracts being contracted for. It maintains three depositories in London, viz.: a wholesale department at No. 56 Paternoster row, a retail department at No. 65 St. Paul's Churchyard, and a western depository at No. 164 Piccadilly, near St. James's street. Apart from these, its publications are mostly circulated through auxiliary societies, which establish local depositories, colporteurs and book hawkers who traverse the country with them, and the book trade, many of whom keep a supply of its books. In foreign countries they are sometimes kept by booksellers, but oftener distributed through missionaries or their assistants. There are several other societies in Great Britain for the circulation and distribution of religious books and tracts, each of the principal religious denominations having one or more.—In the United States, the diffusion of religious books and tracts was early regarded as important, and the publications of the Christian knowledge society and of some of the other societies above named were sent from England for distribution in considerable quantities. The first religious publication society in this country was the "Methodist Book Concern," originally established in Philadelphia, and which issued its first publication in 1789. It was removed to New York in 1804, and for 29 years had its depository in Crosby street. In 1822 the agents established a bindery, its publications having previous to that time been manufactured by contract, and in 1824 added a printing office. In 1833 it was removed to No. 200 Mulberry street, and in Feb. 1836, its premises were destroyed by fire, and a loss of $250,000 incurred. In 1844 the division of the Methodist church led to the organization of a book concern connected with the Methodist church south, at Nashville, Tenn., which eventually received $200,000 of the capital of the book concern as the share of the church south. The number of distinct works it now publishes is 1,967 bound volumes and 2,096 tracts. The publications of the book concern are divided into 3 classes: 1, publications of the general catalogue, mostly bound volumes, though including some pamphlets, and including also the denominational newspapers and periodicals; 2, those of the Methodist Episcopal Sunday school union, which was organized in 1827 and reorganized in 1840, and all the publications of which are printed and issued by the book concern; and 3, those of the Methodist Episcopal tract society, also issued through the book concern, and which have amounted annually for the past 5 years to 10,928,580 pages. Both the Sunday school union and the tract society have periodicals devoted specially to their objects; those of the former, 3 in number, have a combined circulation of 248,000 copies, and that of the latter 53,000. The book concern has a depository in Cincinnati, which publishes periodicals and a few books; it has also depositories publishing denominational journals, and keeping full supplies of its books, at Boston, Pittsburg, Chicago, St. Louis, and San Francisco; and the min-

TABLE OF AMERICAN TRACT

	Name of society.	Date of organization.	Whole number of publications.		Whole number of copies issued.		Gross expenditure since organization.
			Volumes.	Tracts.	Volumes.	Tracts.	
1..	American Tract Society (New York)	1825	312	1,562	16,685,583	219,454,676	$6,884,287 37
2..	American Tract Society, Boston*	1814	148	204	414,798	2,948,451	1,442,375 09
3..	Methodist Episcopal Book Concern *†	1789	1,967	2,096	....	....	....
4..	Baptist Publication Society	1824	326	321	....	....	....
5..	Presbyterian Board of Publication, O. S.	1838	759	297	‡9,600,688	....	1,501,572 00
6..	Presbyterian Publication Committee, N. S.	1852	74	27	....	....	....
7..	Lutheran Publication Society	1855	22	4	58,100	....	....
8..	American Reformed Tract and Book Society	1851	85	125	....	....	....
9..	Congregational Board of Publication	1829	56	49	....	....	....
10..	Am. Swedenborg Printing and Publishing Society	1849	19	..	25,750	....	....

* Annual returns for average of 2 years. † Including Sunday school union and tract society. ‡ Volumes and tracts together.

isters of the denomination form an active and energetic body of agents for the sale and circulation of its journals and tracts.—The primary operations of the Methodist book concern had reference rather to the publication of books than tracts. There were however other efforts made for tract publication in the United States, near the time when it was established. The Rev. John Stanford, who emigrated to New York in 1786, had published and circulated tracts in England, and continued to do so after his arrival in America. The Rev. Dr. Jedidiah Morse, of Charlestown, Mass., in 1802 published editions of 19 tracts amounting to 32,806 copies, which were mostly distributed in Maine, Kentucky, and Tennessee. The Rev. Dr. David Tappan, divinity professor in Harvard college, and Mr. Ensign Lincoln of Boston, also published and circulated a considerable number. In Sept. 1803, the "Massachusetts Society for promoting Christian Knowledge" was founded by Dr. Morse, Dr. Holmes, and others. In 1815 it had printed 8,224 copies of books and 30,850 of tracts. In 1807 the "Connecticut Religious Tract Society" was organized at New Haven by Dr. Dwight, Jeremiah Evarts, and others, and published a series of 26 tracts, of which it circulated about 100,000 copies. In 1808 a "Religious Tract Society" was formed at Middlebury, Vt., which issued a number of tracts. In 1810 the "Protestant Episcopal Tract Society" was formed in New York, of which Bishop Hobart was president, and which prior to 1815 published 13 different tracts. In 1811 the "Evangelical Tract Society" was founded in Boston. The "Religious Tract Society" of Albany was organized in 1811, that of New York in 1812, and those of Philadelphia, Baltimore, and Hartford in 1816. Between 1814 and 1824, 8 other tract societies had been established in New York, Baltimore, Newark, Cincinnati, Washington, Albany, and Boston. One of these was the "New England Religious Tract Society," afterward the "American Tract Society" at Boston. It originated in Andover, Mass., and the Rev. Ebenezer Porter, D.D., and Justin Edwards, D.D., with some of the other professors of the Andover theological seminary, were the prime movers in it. It was organized in May, 1814, and chartered by the Massachusetts legislature in 1816. In 1823 its name was changed to "American Tract Society." From 1816 to 1825 its depository was at Andover. In 1825 this society had 205 auxiliaries, had issued 177 general tracts and 19 of a series for the young, had published in all over 800,000 copies, and had commenced the publication of an almanac and a monthly journal. In the spring of 1825 the "American Tract Society" was organized in New York, and was intended to unite the local societies then in existence as far as possible as auxiliaries. The Boston society became a branch of it, the former taking the stereotype plates and publications of the latter at cost, and furnishing them with its publications at a price not greater than the cost of their manufacture there. This union continued until May, 1859, when, in consequence of the dissatisfaction of a considerable number of the members in New England and elsewhere at the hesitation of the American tract society of New York to publish tracts or treatises on the subject of slavery, the society at Boston withdrew and resumed its independent position. From that time to May, 1861, it had published 204 tracts and 148 bound volumes. Of the latter there had been printed during the year 283,221 copies, and of the former 1,813,900, beside its periodicals, which had an aggregate monthly circulation of 225,000 copies. It employed during that year 59 colporteurs at an expenditure of $8,738.56. Its aggregate receipts for that year were $75,042.37, of which $49,677.07 was from sales of publications. The American tract society at New York grew rapidly, and has become one of the largest of the national benevolent societies of the country. From April, 1825, to April, 1861, its gross receipts were $6,884,237.37, of which $4,267,368.63 was from sales of books, tracts, and papers, and $2,616,868.74 from donations and legacies. Its average annual receipts for the last 10 years have been about $380,000, and during the same time it has granted in cash to missionaries and others in foreign countries an average of $15,500 per annum, and in its publications at home an average annual value of $45,846. Since the formation of the society it has printed 16,635,533 volumes and 219,454,676 tracts, an aggregate of 5,852,630,598 pages. The whole number of distinct works published by the society from its origin has been 312 bound volumes, 1,290 tracts, and 272 cards, &c.; in all, 1,874. In 1842 the society commenced its colportage sys-

AND PUBLICATION SOCIETIES, 1861.

	Annual issues of past 5 years.		Average annual expenditure for past 5 years.	Colporteurs.	Annual expenditure for colportage.	Monthly circulation of periodicals.	Amount received since organization from donations and legacies.	Amount received since organization from sales of books, &c.	Average annual amount of donations for last 5 years.	Average amount of sales for last 5 years.
	Volumes.	Tracts.								
1..	871,000	9,450,000	$367,400	576	$99,105	412,000	$2,616,868 74	$4,267,368 63	$124,000	$241,000
2..	283,221	1,813,900	66,907	59	8,738	205,000	668,196 76	755,506 84	22,593	88,625
3..	1,405,909	2,109,000	....	..	....	1,123,000	265,324 00	....	15,920	645,624
4..	....	....	84,867	41	13,871	99,838	....	....	15,087	84,788
5..	404,250	884,167	119,488	242	86,146	90,400	804,624 00	1,196,548 00	26,828	92,486
6..	....	....	....	..	....	....	....	....	....	....
7..	...	....	....	..	....	45,000	....	....	....	....
8..	17,804	118,169	6,850.22	..	....	12,000	....	....	....	....
9..	....	....	7,485	1	200	....	....	....	2,454	3,118
10..	....	....	....	..	....	....	....	....	....	....

tem, which it has maintained up to the present time. The *colporteur*, as the term is employed by the society, is not simply a book hawker or peddler, but an itinerant missionary, who enters upon the work of distributing its publications either by sale, partial sale, or gift, as may seem best in each case, from the desire to do good; his expenses are partially met by the society, and partially defrayed by the sales of books. The society estimate the cost of maintaining a colporteur annually in the country at $262.41, and in the city at $367.56; but as his labors are in many particulars similar to those of a home missionary, in the establishment of religious meetings, Sunday schools, family worship, and the promotion of temperance and social order, especially in the newer states and territories, the expense of the enterprise is no valid objection to it. In 1860–'61, 576 colporteurs served the society for a period equal to the labors of one man for 232 years, in 32 states, the District of Columbia, the Choctaw nation, Canada West, and Prince Edward's Island. The entire expense of the colportage operations of the society for 1860–'61, inclusive of superintendence, &c., was $99,105.06. The following is a portion of the work performed by its colporteurs for 20 years: time employed, months, 44,097; number of volumes sold, 7,272,593; volumes granted, 2,098,469; public meetings addressed and prayer meetings held, 201,417; family visits, 8,389,807; families destitute of religious books except the Bible, 741,778; families destitute of the Bible, 460,249; families habitually neglecting evangelical preaching, 1,124,630.—The various religious denominations have each also their tract or publication societies, and many of them issue a considerable number of publications. The table on the two preceding pages gives the most important particulars concerning some of them, up to the close of their last financial year.

TRACTORS, METALLIC. See PERKINS, ELISHA.

TRACY. See DESTUTT DE TRACY.

TRADE. See COMMERCE.

TRADE MARKS, particular marks or signs which a trader affixes to his goods and manufactured articles, to enable the public to distinguish them from other similar goods or articles. The law in relation to trade marks is very recent both in England and the United States, though a case sustaining its principle occurs as long ago as the 22d of Elizabeth (1580). Though it does not arise from nor depend upon, and is not regulated by, statutory provisions, it is like the law of patents in its general purpose, which is to protect a man in the enjoyment of all reasonable advantages derivable from his superior skill or integrity, and the reputation he has won thereby; and in administering, or rather in making and developing the law of trade marks, courts have adopted many of the principles and rules of the law of patents. The leading principles established by the decisions of the courts appear to be as follows: 1. Every manufacturer, and also every merchant or trader for whom the goods are manufactured and whose business it is to sell them, may put upon the goods which he manufactures, or which are manufactured for him to sell, whatever peculiar mark or device he chooses, for the purpose of so identifying the goods he makes or sells, that the public, or all who purchase or use them, may readily distinguish them from other goods. 2. When such mark is adopted and used, no other person has the right to assume or use this mark. 3. The intention of the manufacturer or merchant in using the mark, and the effect of the mark itself, must be, not to express or indicate the excellence of the goods, or any peculiarity in their quality, or give them a certain name; for so far as trade marks do only this, no one can have an exclusive right to or in them; but the intention and effect of the mark must be to indicate their origin and ownership, and connect them with the manufacturer or trader, as it were personally. 4. A violation of this right to a trade mark must (as a consequence of the last stated principle) be, not a mere endeavor to persuade the public that the goods of him who uses it after another are equally valuable with those of him who first appropriated and used this trade mark; but it must be a false adoption of a mark, with the intention and effect of persuading the public that the goods are actually the goods of the manufacturer or trader whose mark it is. 5. The violation is sufficient in law, if it does not adopt and repeat precisely the original trade mark, but only imitates this, with the intention that it should be regarded as the original; and it is said that this kind of violation of the right of the proprietor is complete when the imitation is so close that a careful examination is required to enable a purchaser to distinguish between the true and the simulated trade mark; and any thing is a violation of the right which has this effect. Hence the transfer of the trade mark of the plaintiff from a superior article of his manufacture to an inferior article also of his manufacture, but which bore usually a different mark, has been regarded as a fraud both against the public and against the manufacturer. 6. It is no excuse or justification for the use of another person's trade mark, that he who thus falsely uses it communicates the fact to his purchasers, who therefore are not deceived; because by using falsely this trade mark, he enables those who purchase from him to deceive those who purchase from them, and he may reasonably be supposed to have intended this; and the injury to the actual proprietor of the trade mark is the same. 7. The rule, and the principles which govern its application, appear to be extended to all kinds of property held by the owner for the use of the public with compensation to him, and in which there can exist a peculiar and personal right of appropriation. Thus, it has been held that a public conveyance, as a stage coach or omnibus, may have a good will attached to it of a beneficiary nature; and if it be distinguished by a peculiar device or sign, no one will be permitted to draw this good will away by a fraudulent imitation of this device or sign. 8. One whose exclusive right in his own trade mark has been violated, may have his remedy at law or in equity. At law, by a suit for damages; and they will be measured by the loss of sales to the owner, and by the injury done to the reputation of his business or his merchandise. It may not be quite certain whether a jury may give vindictive or punitory damages, that is, may swell their damages beyond actual compensation to the plaintiff by way of punishment to the defendant. It is however clear that the jury would have a wide reach in estimating the injury he has sustained in his business. It has been held, and may be regarded as a prevailing rule, that the plaintiff cannot recover damages for past sales, unless the defendant intended to deceive, or at least knew that he was selling goods which bore the plaintiff's marks. But whether the defendant was or was not ignorant of this, the plaintiff may still have his remedy in equity. This remedy consists mainly, if not altogether, of an injunction against the defendant, which shall prevent his making any further use of the plaintiff's trade mark. The plaintiff may generally resort both to legal and equitable remedy; and it appears that where the fact of the violation of the right is doubtful, equity will not give relief by way of injunction, until this fact of violation has been determined by an action at law. 9. It is a very important rule, that aliens may sue for a breach of their exclusive right to their own trade marks; and some of the most instructive and interesting actions to vindicate this peculiar right have been brought by aliens before the courts of some of the United States; as by Taylor, an English manufacturer, against Carpenter, a citizen of the United States, for a fraudulent use in this country of the plaintiff's trade mark of "Foster's Persian Thread;" by Coats, another English manufacturer, against Holbrook, about Coats's thread; and by Gillott, an English steel pen maker, against Kettle, for putting the mark appropriated by Gillott to his pen "No. 303" to his pen "No. 753," which was a cheaper pen of inferior quality.

TRADE WINDS, atmospheric currents moving with great uniformity toward the equator to fill the spaces left by the airs that have become heated and passed up to the more elevated portions of the atmosphere in the belt of the equatorial calms. These currents, moving continually toward larger parallels of latitude, do not at once acquire the increasing eastwardly movement of the portions of the earth's surface revolving beneath, and the lagging occasioned by the earth slipping away under them produces a deviation from a direct meridional movement as respects the surface of the earth, and an apparant progress of the currents toward the west. Thus the course of these winds in their range N. of the equator is from the N. E., and S. of the equator from the S. E.; and the two systems are known respectively as the N. E. and S. E. trade winds. Near their commencement they partake more of the easterly character, and as they approach the equator they move more upon the meridians. They disappear in the belt of calms, or the "doldrums," the limits of which vary with the seasons, the N. border being sometimes in lat. 4° and sometimes 10° or 12° N., and the S. border in lat. 3° N., and at other times a few degrees S. of the line; the average width of the belt is about 6°. The S. E. trade winds, when the sun is in the northern hemisphere, may thus blow across the line; and the N. E. trades when the sun is S. may reach within 4° of it. The points where these winds originate in the northern hemisphere are from 25° to 32° from the equator, varying with the seasons; and thus these winds in the latitudes included between the degrees named have the character of periodical winds. In the southern hemisphere the trade winds, when the sun in its S. declination approaches the tropic of Capricorn, are felt as far as lat. 30° S., and their N. limit is then about lat. 1° N. The general width of the belt of the S. E. trades is about 9° greater than that of the N. E. trades. The trade winds are greatly affected by the proximity of land as well as by the change of the seasons. In the Atlantic ocean off the coast of Africa the influence of the hot desert regions in the interior is so powerful, that for 50 to 80 m. out to sea the prevailing winds are from the W., and the regular trades are not fallen in with until outside of this influence. In the Pacific ocean the steady S. E. trades do not blow within about 500 m. of the coasts of Peru and Chili, the general direction of the winds in this space being from the S., parallel with the coast. The effect of the hot districts of Asia in modifying the N. E. trades is noticed in the article MONSOON. The numerous islands and shoals in the Pacific produce great irregularities in the direction and strength of these winds, which where no such disturbing causes exist blow with remarkable constancy and steadiness; and it is by the facilities they thus afford to navigation that they have acquired the name of trade winds. By taking advantage of them, vessels may run a regular course often for weeks together without shifting a sail, and all the time enjoying delightful weather, which everywhere prevails under the regular trades. This course may be before them or obliquely across their line in either direction. Where their regularity is disturbed by local causes at certain seasons, as in the periodical changes of the monsoons, terrific storms are of frequent occurrence, alternating with periods of calms and light variable breezes. At these times are experienced the most violent extremes of heat, rain, tornadoes accompanied by waterspouts, and the most vivid displays of lightning and awful bursts of thunder. The region about

Madras in India is particularly exposed to the violence of these phenomena, which recur every 6 months. Vessels at these periods avoid the coasts; and so violent are the storms of wind, that even the fish from the sea are often found upon the tops of the houses, being blown off from the waves or carried up by the waterspouts and then blown inland. Though in general the trade winds from local causes lose their marked characteristics upon the land, there are in the equatorial regions of South America vast plains at a low elevation, as those of the Amazon and the Orinoco, where the conditions are favorable for the prevalence of atmospheric currents which depend in their origin and continuance upon general causes, as the rotation of the earth and the relative temperatures of different zones; and accordingly in these regions constant winds from the E. are encountered, which up the Amazon especially blow with great force across the continent as far as the hilly country at the base of the Andes. A strong wind from the E. also blows continuously over the W. portion of the desert of Sahara, which is known as the *sahel;* and in the E. part winds prevail from the same quarter, but are more like the trade winds from their diminished force and somewhat fluctuating character.—The trade winds were unknown to the ancients; they were first observed by Columbus in his first voyage to America. He fell in with them soon after leaving the Canary islands; and his vessels in the favorable breeze, which changed not from day to day, were wafted rapidly across, much to the alarm of his sailors, who saw no prospect of making their way back against winds thus blowing always in the same direction. It was at last by taking a course through more northern latitudes, that Columbus, who had probably gained some knowledge of the trade winds in his previous excursions to the Canary islands, succeeded in avoiding them on his return voyage. The early navigators in the accounts of their voyages dwelt with much interest upon the delightful atmosphere of the region of these winds, and were reminded by the balmy air and unclouded skies of the most perfect days of the fine climate of Andalusia.—The true explanation of the trade winds was first proposed by George Hadley in the "Philosophical Transactions" for 1735. Galileo had previously associated their movement with the rotation of the earth, but did not arrive at a clear understanding of the phenomenon, especially in its relation to the heat of the equatorial belt, the region of calms there existing, and the vibration of the range of the winds N. and S. with the change of the seasons. Hadley explained the effect of the winds in their progress toward the equator not immediately acquiring the more rapid motion of the surface of the earth, due to its increasing diameter, and thus in fact falling behind with an apparent easterly movement; and Capt. Basil Hall, in his "Fragments of Voyages and Travels," was the first to show that on this principle the winds when near the equator, and passing over diurnal circles of very slowly increasing radii, should acquire the rotatory movement of the surface and appear only as meridional winds, which is the case in the latter portions of their course.—It is an interesting question as to the subsequent destination of the vast bodies of air that continually collect from the N. and the S. in the equatorial belt, and are carried upward as their density diminishes through the heat they absorb. That they must be returned in some manner to the localities whence they came, in order to keep up the never ceasing currents, cannot be doubted; and evidences of a counter movement in the upper regions of the atmosphere are occasionally observed when clouds appear in the usually clear sky of the trade winds, their motion being contrary to that of the winds at the surface. It has also been observed that upon the highest portions of the Canary islands during the prevalence of the trade winds, the wind blows continually from the W. and with considerable force. Humboldt noticed the same phenomenon at the top of the peak of Teneriffe, a strong S. W. wind there blowing while the N. E. trades prevailed over all other portions of the island. But the most remarkable incident bearing upon this question was the precipitation in 1812 upon the island of Barbados of volcanic ashes carried through the air from the volcano of St. Vincent, then in eruption, about 60 m. to the W. These matters, it is evident, must have been thrown up from the crater above the level of the trade winds into a current moving in the opposite direction, by which they were wafted beyond Barbados to the E., and then descending were brought back by the trade winds to this island. Mr. Maury, in his "Physical Geography of the Sea," advances a theory that the airs brought from the S. cross those from the N. as they ascend in the equatorial belt, the two sets by some unknown influence keeping distinct from, though intermingling and passing through each other, and each upper current again descends to the surface on reaching the tropic of Cancer or of Capricorn, passing through an upper current moving in an opposite direction, which on descending becomes the trade wind moving toward the equator. He imagines that beyond the tropics the general movement of the surface winds is toward the poles, where, all meeting as upon the equator, an upward and rotatory movement takes place in which the currents again pass through each other and return to the tropics on the opposite side of the globe as an upper current.—The trade wind belt is bounded toward the poles by a region in which the winds are variable, those from the W. generally prevailing. In the northern hemisphere they are not so regular as in the southern. It is in this region that the Atlantic is crossed by vessels passing between New York and Liverpool; and it is noticed of the passages made by the packets for a period of 6 years, that the average length from New York was 28 days, and from Liverpool 38 days.

TRAFALGAR. See Cape Trafalgar.

TRAFALGAR, Battle of. See Nelson, Horatio.

TRAGACANTH. See Gum, vol. viii. p. 568.

TRAGEDY. See Drama.

TRAGOPAN, a name given by Cuvier to the birds of the pheasant family comprised in the genus *ceriornis* (Swains.). The bill resembles that of the common fowl; the wings are ample and very concave, with the 4th to the 7th quills the longest; tail rounded, and its coverts ample; tarsi stout and armed with a small spur, anterior toes united at the base by membrane, and the claws long and curved. There are 3 or 4 species, inhabitants of the gloomy and thick pine forests of the high mountains of central Asia; they are solitary and shy, and discoverable only by their shrill whistle; the plumage is very brilliant, being red, varied with black, blue, and golden, and with white eye-like spots. The best known species is the horned pheasant (*C. satyra*, Swains.), of the size of a large domestic fowl; the males have the sides of the head naked, and in the spring behind each eye a long horn of a reddish and bluish color directed obliquely backward, and under the throat long, naked, bluish, expansile wattles; the feathers are lengthened and disunited on the crown, purplish black, becoming crimson on the occiput; back of neck and bare skin in front surrounded by deep black; wings and back brown with an eyed white spot at the end of each feather; rest of plumage deep red with small spots of white; the female and young are brownish, and have neither the horns nor the wattles; the males do not attain the full beauty of their plumage till the 3d year. The food consists of grains, roots, insects, and larvæ. This is probably the tragopan mentioned by Pliny. The golden-breasted and the black-headed tragopans, of the same size and similar habits, are sufficiently characterized by their names, the plumage being in other respects not very unlike.

TRAGUS, Hieronymus, the Latin name of a German botanist, whose real name was Bock, born in Heydesbach in 1498, died in Hornbach in 1553. He received a classical education, and became head of a school in Deux Ponts, and superintendent of the ducal garden. Having embraced the reformed religion, he became pastor of a church in Hornbach, and afterward was physician of the count of Nassau in Saarbrück. He devoted himself to the study of botany, and in 1551 published *Neues Kräuterbuch vom Unterschiede, Wirkung und Nahmen der Kräuter, so im Deutschland wachsen* (fol., Strasbourg). This was the first attempt made in modern times toward the classification of plants.

TRAJAN (Marcus Ulpius Trajanus), a Roman emperor, born, according to some authorities, in Italica, the modern Alcala del Rio on the Guadalquivir, not far from Seville, Spain, Sept. 18, A. D. 52, died in Selinus (afterward called Trajanopolis), Cilicia, in Aug. 117. He was the son of Trajanus, an officer in the imperial service, and early embraced the profession of arms. He served as a military tribune in the wars of the East, probably directly under his father, before 86 was made prætor, and in 91 became consul along with M. Acilius Glabro. After discharging the functions of this office he went to Spain, and was ordered by Domitian to go to Germany and command the troops on the lower Rhine, the head-quarters of his department being at Cologne. Although little is known of his early history, he must have become distinguished and popular, for when at the close of 97 Nerva adopted him and chose him as his successor, the selection met with general acquiescence both among the people and the soldiers, although none of the previous emperors had been born out of Italy. His title after his elevation to the imperial dignity was Imperator Cæsar Nerva Trajanus Augustus. In Jan. 98, Nerva died, and Trajan, who was then encamped at Cologne, succeeded to the throne; but for many months he did not go to Rome, being engaged in settling the commotions which had disturbed the security of the frontiers of the Rhine and the Danube. He entered Rome amid the acclamations of the people, and soon proved by his conduct that the hopes raised at his assumption of the purple were destined to be fulfilled. He received the title of Pater Patriæ, and was also honored with the new designation of Optimus. He bestowed a gift of money on the soldiers and also on the Roman citizens; made provision for supporting the children of the poor; victualled Rome by allowing the entrance of grain free of duty; issued edicts against informers; curbed the insolence of the prætorian troops; and appointed men of high character to public offices. In 100 the younger Pliny, who was the warm personal friend of the monarch, pronounced his panegyric upon him. In 101 Trajan left Rome for the purpose of carrying on a war against Decebalus, king of the Dacians, who had obliged Domitian in a previous struggle to buy peace by making an annual payment of money. Trajan crossed the Danube, defeated the Dacian monarch, took many of his strong posts and his capital Sarmizegithusa, and, having compelled him to sue for peace, returned to Rome in triumph with the title of Dacicus. In 104 Decebalus broke his treaty, refused to comply with the emperor's demand that he should surrender himself, and when Trajan marched against him first attempted to save himself by sending two men to poison his enemy under the pretence that they were deserters. The conquest of Dacia was now determined upon, and an immense bridge was built across the Danube, over which the Roman army passed into that country. This bridge was the largest work of the kind ever built by the ancients, and, according to the statement of Dion Cassius, consisted of 20 piers, 150 feet high, 60 feet wide, 170 feet apart, and united by wooden arches, and was probably in the neighborhood of the modern town of Tchernetz in Wallachia. Trajan was successful in this campaign in spite of the numerous obstacles to be met with in a country unknown, inimical, and having no roads. Decebalus was defeated at all points, and in despair killed himself; Dacia was reduced to the condition of a Roman province, and fortified posts were built and colonists settled in it. When the emperor returned to Rome, he exhibited to the people games which lasted 123 days, and in which 11,000 animals were killed and 10,000 gladiators fought. In 106 he went on a campaign against the Parthians and Armenians, and was engaged during the following years in numerous military expeditions, the history of which is almost altogether lost. In the year 112 occurred his 6th and last consulship. In the spring of 115 he marched against the Parthians, having previously received the submission of Armenia and the princes of the neighboring countries. He crossed the Tigris on a bridge of boats, subdued the country beyond that river, and returned to Antioch the same year; and while there a great earthquake occurred from which Trajan barely escaped with his life. In the following year he again marched to the Tigris, and sailed down that stream to the Persian gulf, but was recalled by a general uprising in the provinces which he had reduced. Arriving at Ctesiphon, he gave the Parthians a king whom that turbulent people quickly expelled. After the siege of Atræ in Mesopotamia, he fell sick, and, leaving his successor Hadrian in command in Syria, started for Italy, but died on the way. His ashes were carried to Rome in a golden urn, and placed under the column bearing his name, which he had caused to be erected in honor of his Dacian victories.—Our knowledge of the events of Trajan's reign is very imperfect and unsatisfactory, but we know that for many generations afterward it was looked upon as the most brilliant in the imperial annals. The Roman arms were carried further than ever before or after, and rarely suffered defeat. Beside the conquests in Dacia and beyond the Euphrates, Arabia Petræa was made subject to the empire by A. Cornelius Palma, the governor of Syria. Nor were his works for the internal improvement of his dominions less important. He constructed an artificial harbor at Centum Cellæ (now Civita Vecchia), built the port of Ancona, made several great roads in various parts of the empire, one of which was across the Pontine marshes, and erected magnificent bridges. He founded several libraries in Rome, one of which, called *Ulpia Bibliotheca*, was very celebrated; built a theatre in the Campus Martius, and also the Forum Trajanum, his great work, in the centre of which was the column of Trajan, erected in 112. It has been alleged that his private character was disfigured by intemperance and licentiousness. Many writers doubt the magnitude of the persecution of the Christians which is said to have taken place during his reign. His correspondence with the younger Pliny, governor of Bithynia and Pontus, concerning the treatment of the members of that sect, displays in his character an unusual consideration for justice and humanity. In his reply to Pliny he says: "You have adopted the right course, my friend, with regard to the Christians; for no universal rule, to be applied in all cases, can be fixed in this matter. They should not be searched for; but when accused and convicted, they should be punished; yet if any one denies that he has been a Christian, and proves it by action, namely, by worshipping our gods, he is to be pardoned upon his repentance, even though suspicion may still cleave to him from his antecedents. But anonymous accusations must not be admitted in any criminal process; it sets a bad example and is contrary to our age." The conquests of Trajan were abandoned by his successor Hadrian, who restored the empire to its former limits; but his memory was long cherished by the Romans, and 200 years later the senators were in the habit of saluting the emperor with the acclamation: "Be happier than Augustus and better than Trajan." The best modern authorities for the history of his reign are his life in Tillemont's *Histoire des empereurs*, and H. Francke's essay *Zur Geschichte Trajans und seiner Zeitgenossen* (1837).

TRALL, Russell Thacher, M.D., an American physician, born in Vernon, Tolland co., Conn., Aug. 5, 1812. His parents removed to western New York in his childhood, and he was destined for the life of a farmer; but ill health led him to the study of medicine, and for some time he practised the profession in accordance with the principles of the standard medical writers. In 1840 he removed to New York, and after acquiring a knowledge of the theories and practice of the homœopathists, the hydropathists, the disciples of Sylvester Graham, &c., he came to the conclusion that the use of drugs for medicinal purposes was injurious under all circumstances, and contrary to the laws of nature; and that water, air, temperature, light, exercise, rest, sleep, food, and passional influences were the only true remedies for disease. He gave considerable prominence to water as a remedial agent, but excluded all drugs from his practice. In 1843 he opened a water-cure establishment in New York, over which he still presides; and in 1853 he established in connection with it a medical school for pupils of both sexes, which was chartered in 1857, under the name of the "New York Hygeio-Therapeutic College." This institution is authorized to confer the degree of M.D., and has since its organization given diplomas to about 200 graduates, ½ of them females. Dr. Trall is the professor of theory and practice in this college. From 1845 to 1848 he was editor of the "New York Organ," a weekly temperance journal, and of the "Hydropathic Review," a quarterly magazine. He has also edited since 1845 the "Water-Cure Journal," and for a portion of the time "Life Illustrated," a weekly newspaper; Smith's "Fruits and Farinacea;" Hardell's "Hydropathy for the People;" and Smee's "Accidents and Emergencies." His own works are: "Prize Essay on Temperance;" "Hydropathic Encyclopædia" (New York, 1852); "Hydropathic Cook Book" (1854); "Uterine Diseases and Displacements" (1855); "Home Treatment for Sexual Abuses;" "The Alcoholic Controversy;" "The Complete Gymnasium" (1857); "Prize Essay on Tobacco;" "Diseases of the Throat and Lungs;" "Pathology of the Reproductive Organs;" "Diptheria;" "The Scientific Basis of Vegetarianism;" "Water Cure for the Million;" "Nervous Debility;" "Lecture on Drug Medicines;" "Lectures on Diseases of Females;" and "Principles of Hygeio-Therapy." He has nearly ready for the press a large work entitled "Principles of Hygienic Medication."

TRAM ROAD. See RAILROAD.

TRANCE. See CATALEPSY.

TRANQUEBAR, a town and district of British India, in the province of Tanjore and Madras presidency, on an island formed at the mouth of the river Cavery, 147 m. S. from Madras; area of the district, 15 sq. m.; pop. in 1814, 23,426, since which it has considerably increased. There are two Lutheran churches, a Roman Catholic chapel, and several schools. Tranquebar has some manufactures of cotton cloth, oil, soap, &c. It formerly belonged to the Danes, but was ceded to the British in 1845.

TRANSCENDENTAL (Lat. *transcendo*, to go beyond), in metaphysics, a term applied in general to ideas and doctrines that are not suggested or limited by experience. In the scholastic philosophy, *transcendens* and *transcendentalis* designated any thing that was not *prædicamentalis*, that is, any thing that rose above, was not comprehended in, and could not be defined by, either of the ten *summa genera* or categories of Aristotle. Thus, being was transcendental, and only some category of being was prædicamental. The four scholastic transcendentals were *ens*, *unum*, *verum*, and *bonum* (being, unity, truth, and goodness), to which some added *aliquid* and *res*, which however scarcely differed in meaning from *ens*. Kant gave new and distinct significations to *transcendens* and *transcendentalis*. The former designated what is wholly beyond experience, is conceivable neither *a priori* nor *a posteriori*, and thus lies beyond every category of thought. The latter designated *a priori* conceptions and judgments, which are necessary and universal, and which transcend the sphere, while affording the conditions, of the contingent knowledge furnished by experience. Thus by the transcendental, formal, or critical philosophy of Kant is meant his system of the principles of the pure reason, which occupies itself not with the objects or matter of knowledge, but with the subjective ideas or forms, as time, space, substance, and causality, through which objects are represented to us as phenomena. Objects in themselves (*Dinge an sich*) he deemed transcendent.—In mathematics, transcendental quantities are those which cannot be expressed by a finite number of algebraic terms, but are represented by means either of logarithms, or variable exponents, or some of the trigonometrical functions. Transcendental curves, as the logarithmic spiral, are those whose equation is transcendental, *i. e.*, expresses a relation between transcendental quantities.

TRANSFUSION OF BLOOD, the transferring of blood fresh, or by an interval of time so short as to forbid its cooling or coagulation, from the system of one brute or human being to that of another, or from the vessels of brutes to those of the human subject. The rise or revival of this operation in the 17th century seems to have been instigated by curiosity, or a disposition to inquire into the powers of the animal economy. At this period, Mr. T. Clarke, in England (1657), first performed transfusion upon dogs, but unsuccessfully ("Philosophical Transactions," No. 35); Lower in 1665 succeeded in case of the same animals; and with these and other creatures, as pigeons, and even in transfer of the blood of sheep to dogs, the experiment was many times repeated without apparent injury, within the course of a few years. But while France and England have contested the honor of originating the practice at the period named, Libavius had in 1615 distinctly described the operation in case of the human subject, and had indicated the purpose of renewing vitality, which had been sought from it at a later period; and even a passage in Ovid has been supposed to allude to the process of transfusion. The experiments of Lower and others referred to seem to have revived the most chimerical anticipations of possible benefit from the practice. The first trial on man was by Denys and Emmerez, in Paris, in 1666. Though the accounts are somewhat conflicting, it appears that this experiment was in transfusing several ounces of the blood of a sheep into the veins of a demented youth; and although it was asserted that the intelligence of the subject improved after the operation, yet soon after a second transfusion, which was public, as the first had been, he died in a lethargic condition. The next year Lower and King transferred about 10 ounces of the blood of a sheep into the veins of a literary man, Arthur Coyn, who in ordinary health offered himself for the experiment; no ill consequences ensued at this time; but though on a second transfusion in this case the results were less favorable, the royal society still recommended perseverance in these attempts. In 1668 Riva and Manfredi performed a like operation in Italy. Other unfavorable accidents from the process occurred about this time. Denys and Emmerez having transferred the blood of a calf into the veins of a youth of distinction, Baron Bond, of Sweden, then in Paris, who had intestinal disease, and died of inflammation excited in the parts after the second operation, the parliament of Paris interfered and proscribed the practice; and upon the death of two persons in Rome from the like treatment, the pope also issued a prohibitory edict. From this time the practice fell into disuse, save as a matter of experiment in case of the lower animals. In 1785 Dr. Harwood, professor of anatomy at Cambridge, strove to revive the inquiry; he bled a dog until it apparently expired in convulsions, when, upon replenishing the animal's veins with blood from a sheep, it revived, and being released went home with no apparent injury. To Dr. Blundell, however, and probably about the year 1800, is due the credit of first giving to the process its true and only useful application. Among his striking experiments were those of reviving with the blood of a dog another that had been apparently dead for 5 minutes; and nourishing a dog 3 weeks without food, by mere transfer in that interval, into the external jugular vein, of 84 oz. of blood from other dogs. But Prévost and Dumas, reasoning from the many differences of blood of different animals, not only known but unknowable also, had inferred that transfusion between different species could never be really harmless; and in their experiments, they found that this especially was true when the corpuscles, though of the same form, were of quite unlike size; but still more so when blood with circular corpuscles was introduced into animals in which these bodies have the oval form; so that, if the blood of quadrupeds be introduced into the veins of birds, the latter speedily die as if poisoned, and with violent distress of the nervous system. These results Blundell reaffirmed; and the application which he made of the practice was, as a means of recovery, by transfusion of human blood, in persons threatened with imminent death from excessive hæmorrhages, as under surgical operations, or in some of the accidents of parturition; and in those cases in which, even if death did not threaten at once to result, the extreme loss and prostration must in the judgment of the practitioner be followed only by more lingering dissolution of days or weeks, with the incidental debility, dyspepsia, diarrhœa, and nervous maladies. His instruments for the purpose were an impellor (syringe with needful tubes) and gravitator; they have since been improved by Weiss, Laundy, and others.—The instruments when used should be perfectly clean, air-tight, and warmed to the temperature of the blood. Opening a vein of the patient's arm just sufficiently to admit the small end of one tube, and fixing the opening by a probe, blood must be drawn through a free opening in the vein of some healthy person, and, as it flows into the appropriate basin, is to be slowly sucked up, and without any admixture of air, by the syringe through the other tube. The syringe and tubes being entirely filled until blood flows clear from air from the end of the tube to be introduced, this is inserted into the patient's vein, and a steady and slow injection performed, the greatest care being required that neither air nor clots shall be thrown in, and that the charge shall not be so sudden as to occasion shock or congestion or to overpower the heart, the action of which is necessarily enfeebled. Hence, if headache, flushing of the face, fainting, or other unpleasant symptoms occur, after the injection of 2 or 3 oz., the operation should be suspended for a few moments; otherwise, it is to be continued until some good effect is perceived, though usually 4 or 5 oz. suffice for this, and the quantity should never exceed from ½ to 1 pint. A second or even third injection, after the lapse of some little time, may be advisable. Since the remedy is one attended with some hazard, it should not be resorted to until all others have failed or obviously must fail; but when this point is reached, and the operation is decided upon, no delay should occur. In certain cases, the shock and exhaustion of the brain or heart cannot be overcome, and death takes place in spite of the operation; if the last agony has actually commenced, transfusion must be unavailing; and the futile anticipation of renewing and prolonging the life of persons sinking under ordinary disease or of old age, by introducing into their veins the blood of the young and vigorous, is no longer entertained. But in cases such as those already indicated, the operation has now been frequently resorted to with benefit.

TRANSIT, in astronomy, the passage of a planet across the disk of the sun, or of a satellite across the disk of its primary; also, the passage of a heavenly body across the meridian of the place of observation, sometimes called its culmination. Of the planets, only Mercury and Venus, having orbits within the orbit of the earth, can present this phenomenon. The transits of Venus are of great importance, being employed for no less an object than the determination of the sun's distance; they recur at alternate intervals of 8 and 105½, and 8 and 121½ years. The earliest transit of the sun's disk of which we have an account is that of Venus in 1639, predicted and observed by Jeremiah Horrox, an amateur astronomer of Lancashire, England. The last occurred in 1769, and was observed with great care in opposite quarters of the earth, expeditions having been equipped for that purpose by several European sovereigns; the solar parallax as now received was then determined. The next will occur Dec. 8, 1874, and is looked forward to with great interest for verifying these determinations. The transits of Mercury are much more frequent than those of Venus, in consequence of the former planet being nearer the sun, and having thus a narrower orbit and a shorter year; but they are not available for the determination of the solar parallax. The transit of stars is employed in the determination of longitude. (See Longitude.) The precise relative situation of the heavenly bodies in respect to their right ascension is determined by comparing together their exact times of transit; these times are ascertained by means of an instrument known as the transit.

TRANSIT CIRCLE, an astronomical instrument used for determining the absolute positions of the heavenly bodies. As these positions are given by two independent elements, the right ascension and declination, corresponding to geographical longitude and latitude, so this instrument is a combination of two independent constructions, each giving its share to the name of the whole, and each furnishing its corresponding element by independent and yet simultaneous observation. The transit circle now forms an essential part of the equipment of every well constituted observatory; upon the perfection of its details the mechanical artist and the mechanical astronomer have lavished their best efforts; and for the symmetry and harmony of its arrangements, no less than for the exquisite delicacy of its mechanism, it may fairly be considered the masterwork of modern instrumental astronomy. The two constructions which have here combined their powers are the transit instrument and the meridian or vertical circle. The former consists of a telescope whose tube is composed of two slightly conical portions firmly secured at their bases to opposite sides of a hollow central cube, from two other opposite sides of which proceed also equal cones of more massive make, generally indeed cast in the same piece with the cube, and forming an axis at right angles with the telescope. At or near the extremities of this axis are two perfectly cylindrical, highly finished pivots of hardened steel, corresponding in position to sockets resting upon stone columns which, based firmly in the ground, exactly east and west of each other, and rising to a convenient height, support the instrument so that the telescope revolves freely between them in the plane of the meridian. This gives the simple transit instrument, by which and its necessary accompaniment, the clock, is observed the time of meridian passage—the transit—of the star whose place is to be determined. If now we attach firmly to the axis a finely graduated circle which will revolve with the telescope, we shall be enabled, by means of its divisions, to measure also the precise altitude of the star at the same instant of culmination; and thus the transit circle will give, by the first observation, the desired right ascension, and by the second, the desired declination of the object. This combination is entirely of modern date. Transit instruments and meridian arcs and circles have been used ever since the days of Roemer and Picard, but the first real conjunction of the two dates from the close of the first quarter of the present century.—In considering the mechanism of the transit circle, we will first notice the sockets which receive the pivots and determine the position of the instrument. These sockets are not formed, as might be supposed, of circular "boxes" accurately fitting the pivots, but are simply solid little pieces of gun metal, cut away at the upper surface by two planes inclined to each other like the sides of the letter V, from which letter they take their technical and convenient name. In these V's the pivots revolve smoothly and truly, touching the inclined sides at but two points, and consequently without the lateral play which it would be impossible to avoid in circular boxes, however truly ground. Again, the stone piers upon which the instrument rests, even though wrought into perfect symmetry and equality in every respect, and though posited in such a manner as to furnish no apprehension of relative change, will yet continually manifest such change, sometimes under the influence of varying temperature from day to night and night to day, but more frequently from causes even more irregular and less known than this. In order therefore to be able to keep the axis of the instrument duly east and west and truly horizontal, the V's are not permanently bedded in the stone, but are so held by strong plates of the same material, themselves permanently fastened, as to allow of small changes of position, one in a horizontal and the other in a vertical direction. Passing next to the telescope, we notice that the narrower ends of the tapering tubes are terminated by flat rings of precisely the same dimensions, upon which are fitted caps containing, one the object glass and the other the eye tube with its mechanisms. These caps are of exactly equal weight, and, partially entering the ends of the tube, their centres of gravity fall truly in the line of junction with the telescope. Thus the instrument is not only perfectly counterpoised, but also, the caps being convertible, the object glass and eye tube may be and should be periodically interchanged, in order to eliminate from an average result the effect of a possible flexure of the tube. The object glass presents nothing worthy of especial remark, its office being simply, as in every other telescope, to furnish to the observer a perfectly sharp and well defined image of the star, admitting of vision equally distinct, and, so to speak, tangible, with that of the threads in the field of view. The construction of the eye piece is peculiar to this instrument. The term "eye piece" is generally, though incorrectly, applied to the whole mechanism at the eye end of the telescope, which consists of a small tube sliding in the end cap, and carrying not only the eye piece proper, which is of the form known as Ramsden's (see TELESCOPE), but also a conveniently shaped box containing two thin metallic plates. These plates, called diaphragms, are made with central openings, across which are stretched the threads used to mark the star's position in or its progress through the field. One of these diaphragms is used for the observation of transits, and is securely held in place by fine "antagonist" adjusting screws. Across its opening and precisely through the centre of the field is stretched vertically a most delicate thread of spider's web, which, as the instrument revolves, represents to the observer's eye the meridian as a visible line across which the heavenly bodies are seen to pass at the moment of culmination. In order, however, to gain more accuracy in this observation (for the instant of transit is required to be known within a small fraction of a second), other threads are also introduced parallel with the central one and symmetrically disposed on either side of it, so that, by noting the time of crossing each and taking the average, a very great degree of certainty is attained. Ordinarily the transit diaphragm contains either 5 or 7 threads, all at equal intervals; but for special purposes their number and arrangement are adapted to the circumstances. With a telegraphic method of registry, as practised with the large transit instrument of the Washington observatory, 5 different sets or tallies, with 5 threads in each, are sometimes used. Across the same diaphragm is stretched horizontally another fixed thread, as a guide to the observer in placing the telescope so that the star shall traverse the centre of the field. The second diaphragm, carrying only a single horizontal thread, is movable in a vertical direction between truly fitting guides, and by means of a finely wrought micrometer screw. As the first plate belongs to the transit portion of the twofold construction, so this one belongs to and coöperates with the circle, and the office of the screw which carries it is to measure the exact distance of the star, as it traverses the field, either from the fixed horizontal thread, or from some other definite starting point, which may be represented upon the scale of the screw without being necessarily visible. Attached to the screw and revolving with it is a small disk or "head," whose edge is divided into 100 equal parts, so as to measure very accurately the fractions of a revolution, while the whole number of turns necessary to carry the thread to any part of the field is registered upon a convenient scale usually placed within the eye piece and visible with the threads themselves. In order to render thread and scale visible by night, various contrivances are used, the most common of which is to introduce a flat oval ring with whitened surface into the central cube, and with its plane inclined at an angle of 45° with the axis, so that, receiving light thrown in through an orifice in the pivots, it will reflect sufficient into the field to show the threads as black lines upon a bright ground. Sometimes also the illumination is thrown upon the threads themselves, when they appear as bright lines upon a dark ground; and in the great transit circle at Greenwich a very ingenious combination of prisms enables the observer to produce either effect at pleasure.—Upon each half of the axis, between the cube and the pivots, is a circle whose diameter is usually from one third to one half the length of the telescope. These circles with their several radii and cross bars are generally cast each in a single piece, to insure greater firmness and avoid unequal tensions. But the 6-foot circles of the Greenwich instrument just mentioned, weighing about 300 pounds each, are made of two castings, the rim in one, and the whole system of radii and braces in another, the two being afterward firmly bolted together at 12 equidistant points. Upon a narrow band of silver inserted near the circumference of the circles are cut the graduations required for the special office of each; one, used only for pointing the telescope in any given direction, is divided so as to read with a vernier to single minutes, which is abundantly sufficient for the purpose; the other circle, intended for the exact measurement of angles, is divided with the most scrupulous accuracy into arcs of 2, 3, or 5 minutes, as the case may be, and, once fixed upon the axis, should never during observations be handled or subjected to unequal pressure or strain of any sort. Assuming now that these division marks are truly cut, we next look for the means of subdividing the small arcs into seconds and fractions of seconds, and find this accomplished by a system of "reading microscopes." These are microscopes of the ordinary compound construction, but each provided with a micrometer screw carrying, as in the German instruments, a pair of close parallel threads between which the image of the division under consideration can be placed with great accuracy, or, as in Troughton's form, two threads crossing each other at a very acute angle, which may be bisected by the division. The microscopes are so made that one revolution of the screw is equal to a minute, and the micrometer head is divided into 60 equal parts, each of which therefore represents a second. There are usually 4 of these microscopes placed 90 degrees apart; but sometimes as many as 6 are used for the purpose of attaining still greater certainty in the result, both from the greater number of readings and from the probable reduction of the systematic errors of the primary division. The proper method of supporting these microscopes in order to insure their perfect stability has been always a subject of much study. A favorite plan has been to place them on the periphery of another smaller circle which rests, accurately fitting, upon the axis itself, but is prevented from revolving with it by a small projecting bar caught below between two screws attached to the pier. Of late years, however, experience seems to have decided in favor of securing firmly and independently upon the pier itself, near the V-plate, a solid block of metal which serves as the centre of a strong square frame at whose corners the microscopes are attached by suitable adjusting screws. The microscopes are thus entirely disconnected from the circle; and although every new adjustment of the axis will show itself in their record of the graduations, yet this produces no effect whatever upon the mean of readings of opposite microscopes. In the Greenwich instrument, whose piers are broader than the circles themselves, the microscopes are very long, and are passed through the pier itself, converging from the rim of the circle until their eye pieces are collected within a very small space, where the observer reads them with convenience and ease. The graduated limb is bevelled to suit this arrangement, and from another point near the observer a small gas-burner radiates light through other openings in the pier in such a manner as to illuminate uniformly the field of each microscope—a matter of very high practical importance.—With this brief sketch of the construction of the transit circle, we will now consider its use, commencing with the speciality of the transit instrument by showing how it is brought into its proper place in the meridian. It is necessary that the middle vertical thread of the fixed diaphragm be placed truly in the optical axis of the telescope, which is the central line of the cone of rays converging from the object glass. This may be effected by turning the telescope to a very distant fixed object, noting the exact position of this middle thread with reference to the images in the field and then reversing the instrument, when the thread will probably occupy a different position, whereupon it must be brought by the adjusting screws of the diaphragm to a point midway between the first and second places, and the operation repeated until no change appears upon reversal. Next, by means of a spirit level and the vertical adjusting screws of one of the V-plates, the axis of the instrument is rendered truly horizontal; and finally, the approximate sidereal time being known, the telescope is directed to some star, also known, very near the pole of the heavens, and the axis moved by the horizontal adjusting screws of the other V-plate, until at the right moment the star and thread coincide exactly. The three errors thus corrected are denominated the errors in collimation, level, and azimuth respectively. And now, having done our best mechanically to put the instrument right, we turn around, and, by help of stellar observations under properly varied circumstances, are able not only to determine with great precision the small outstanding values of these errors, which by no means remain constant for any length of time, but also to judge the clock that aided us, and finally the very places of the stars that have served as our guides. The errors of instrument and clock having been thus determined, it is possible, by the aid of formulas and methods which have been so thoroughly developed and systematized as to be applicable with the greatest facility, to obtain by a single observation of any new object its right ascension within a very small fraction of a second of time.—But, as we have intimated, the chief value of the instrument consists in its power of furnishing at the same culmination not only the right ascension but also the declination of the object, and it accomplishes the latter most simply in the following manner. While the observer is noting the progress of the star across the transit threads, he at the same time, by a delicate movement of the telescope in altitude, places it so that the star appears to run along the fixed horizontal thread; and then, the transit observation having been completed, he reads, even to the fraction of a second, from the circle microscopes the precise point corresponding to the apparent altitude of the star. Or, a still more accurate determination is obtained by placing the telescope so that the star will traverse the field at a little distance above or below the fixed thread, and there is ordinarily time enough to bring the movable thread several times into coincidence with the star's image by means of the micrometer screw, always noting its indications and afterward taking the mean of all. The small distance from the fixed thread, as thus measured, must of course be duly applied as a correction to the readings of the microscopes, and thus we derive one extremity of the desired arc, and then proceed to find the other. In order to know the star's declination, we must first have its altitude above the horizon. This can sometimes be obtained by a double observation of the star's image, first as reflected from a quicksilver surface, and then as seen directly, in which case the arc included between these two directions is obviously equal to twice the altitude of the star; but this course is not always applicable. We have however a readier and exquisitely beautiful method of obtaining with very great accuracy the direction of the vertical line, from which we can count the star's zenith distance. The telescope being turned so as to look directly downward, we place immediately beneath it a vessel of quicksilver; and if then, by means of a small plate of thin glass held at an angle of 45°, we reflect a strong light down the telescope, it will be reflected back by the quicksilver, and, looking through the glass from above, we shall see not only the threads in the eye piece, but also the reflected image of each; and by moving the instrument carefully until the fixed horizontal thread coincides with its own image, we shall have the telescope mathematically vertical, and may read from the circle the corresponding second point of the desired arc, whereby we obtain the apparent altitude, and thence, correcting for refraction, the true altitude, and finally the desired declination.

TRANSITION ROCKS. See Geology, vol. viii. p. 150.

TRANSMIGRATION. See Metempsychosis.

TRANSMUTATION. See Alchemy.

TRANSPORTATION. See Prison.

TRANSUBSTANTIATION. See Lord's Supper.

TRANSYLVANIA (Hun. *Erdély*; Ger. *Siebenbürgen*), a grand duchy of Austria, forming the S. E. province of the empire, bounded W. and N. by Hungary, N. E. and E. by the Bukovina and Moldavia, S. by Wallachia, and S. W.

by the Military Frontier; area, according to the last changes of the frontiers, 21,197 sq. m.; pop. in 1857, 1,926,727. Capital, Klausenburg. The province is surrounded on all sides by mountains belonging to the Carpathian system, and the surface is much diversified, being traversed by several mountain ranges, between which there are numerous fine valleys and plains. The principal chain extends along the E. and S. frontiers, and sends out many offsets, the most important of which runs in an E. and W. direction and forms the watershed of the country. The range which forms the N. W. boundary toward Hungary is properly designated as Transylvanian Ore mountains. The most elevated points lie near the S. or Wallachian boundary, in the so-called Transylvanian Alps, where Mt. Negoi has a height of more than 8,000 feet above the sea, and Mt. Butchetch is very little lower. The Roman, Red Tower, Vulcan, and Iron Gate passes lead through this range. The whole drainage belongs to the basin of the Danube, the chief rivers being the Aluta (Hun. *Olt*), the Maros with its tributaries the Great and Little Kokel (*Küküllő*), the Bistritz (*Besztercze*), the Szamos, and Körös. There are several lakes and marshes.—The climate varies greatly according to elevation. In the valleys the heat of summer is very great, but in the more elevated districts the winter temperature is remarkably severe and so long continued as to cause serious injury to vegetation. Gold is found in most of the streams in greater or less quantities; and 22 gold mines are worked and are said to be very productive. Silver mines are also worked, and there is one of quicksilver. Copper, lead, iron, antimony, arsenic, tin, coal, alum, bitumen, saltpetre, and salt are all found; together with crystals and valuable pebbles, including garnets, chrysolites, amethysts, chalcedonies, agates, carnelians, and jaspers. A bed of rock salt extends in a belt 60 to 80 m. wide through the whole country, from which great quantities are extracted, as well as from numerous springs. In the more elevated parts vegetation is scanty, but lower down luxuriant forests make their appearance, which yield many kinds of valuable timber. The valleys and plains are particularly fertile, and, although agriculture is in a backward state, yield good crops of various kinds of grain, pulse, maize, hemp, flax, tobacco, saffron, and madder; and the vine and fruits are very generally cultivated. Great numbers of horses, horned cattle, buffaloes, sheep, and pigs are reared, large herds of the last named being fed in the forests. Game is abundant, and the rivers are well supplied with fish. The manufactures consist principally of coarse linen and woollen goods, native silk, different kinds of metals, paper, gunpowder, leather, porcelain and earthenware, glass, stearine candles, soap, furniture, and numerous articles in wood. The exports consist of salt, grain, cattle, wax and honey, tobacco, timber, wood, metals, antimony, hides, and wool; and the imports of various manufactured goods, but more particularly of colonial produce, glass, tissues, and millinery. The transit and commission trade is entirely in the hands of Greeks and Armenians.—The population is composed of various races, including Magyars or Hungarians proper, Szeklers, Saxons, Wallachs, Ruthenians, gypsies, Armenians, Greeks, Jews, and Bulgarians. The Wallachs are by far the most numerous, being about one half of the whole. The gypsies number about 60,000. The religions most numerously professed are the united and non-united Greek (chiefly by the Ruthenians and Wallachs), Calvinist (by the Magyars), Lutheran (by the Saxons), and Unitarian (by the Szeklers). The Magyars and Saxons have the best schools, and those belonging to some of the others are of a very inferior character. The Szeklers, or properly Székelys, who are believed by some to be descendants of the Huns, and by others of the Petcheneges and other tribes kindred to the Magyars, use a dialect little different from the language of the latter, this being also spoken by the Bulgarians and Armenians. The Saxons, descendants of German settlers from Flanders, the lower Rhine, the Hartz, and Thuringia, who established themselves in Transylvania especially in the 2d half of the 12th century, where they are unmixed with other races, speak their own language, the German, with a considerable degree of purity. They enjoy various privileges, based chiefly on a charter granted them by King Andrew II. in 1224, and more equality of rights than the other races. Together with the Magyars and Szeklers they form the constitutionally ruling people. The country is therefore divided into the lands of the Hungarians (chiefly in the N. E.), of the Szeklers (in the E.), and of the Saxons (in the S. and N. E.). The land of the Hungarians is subdivided into the counties or comitats (*megyék*) of Klausenburg (*Kolozs*), Inner Szolnek, Doboka, Thorda, Kokelburg (*Küküllő*), Upper Weissenburg (*Fejérvár*), Lower Weissenburg, and Hunyad, and the districts of Fogaras and Nászod; the land of the Szeklers into the seats (*Székek*) of Aranyos, Maros, Udvarhely, Csik, and Három-Szék; and the land of the Saxons into the seats (*Stühle*) of Hermannstadt, Broos, Mühlenbach, Reissmarkt, Mediasch, Schässburg, Gross-Schenk, Leschkirch, and Reps, and the districts of Kronstadt and Bistritz. Beside the capital, the most important towns are Hermannstadt, Kronstadt, Vasarhely-on-the-Maros, Bistritz, and the fortress Carlsburg (*Károly-Fejérvár*). The constitution of Transylvania, before the revolution of 1848-'9, during which it was reunited with Hungary, resembled that of the latter country, but was more complicated, owing to numerous reserved privileges. It was abolished by the Austrians in 1849, and restored in 1861, though not in its full vigor.—Transylvania in the time of the Roman empire belonged to Dacia, was subsequently overrun by the Huns, Goths, Gepidæ, Lombards, Bulgarians, Avars, Petcheneges, and other tribes, and at the close of the 10th century conquered by the Hungarians, who ruled it by waywodes, for a time disputing its possession with the Cumanians. Having shared the fate of Hungary for centuries, it became an independent principality during the Turkish-Austrian wars, being ruled among others by the Zápolyas, Báthoris, Bocskay, Bethlen, the Rákóczys, and Apafis, until it was finally annexed to Austria in 1713. (See Hungary.) Among the most important recent diets of Transylvania were those opened in 1834, 1842, and 1848. On the E. and S. frontiers the people down to a late date held their land under the tenure of protecting the country against foreign aggression in these directions, the hardy and warlike Szeklers in the E. constituting the principal strength of this military frontier organization.

TRANSYLVANIA UNIVERSITY. See Lexington.

TRAP (Swed. *trappa*, a stair), a class of rocks so named from the stair-like or columnar structure of its masses. The traps are distinguished by their composition, which consists chiefly of feldspar, augite, and hornblende, in various proportions and states of aggregation. Among the principal varieties are the basalts, amygdaloids, greenstones, dolerites, &c.

TRAPANI, a province of Sicily, situated at the W. extremity of the island, bounded E. by the provinces of Palermo and Girgenti, and on the other sides by the Mediterranean sea; area, 1,387 sq. m.; pop. in 1859, 205,566. The coast line is very irregular, and there are several bays, the largest of which is the gulf of Castellamare. The most important of the numerous islands off the W. coast are the three anciently called the Ægates Insulæ, viz., Favignana, Levanzo, and Maretimo. The surface of Trapani is traversed by several offsets from the Madonian mountains, which have their W. extremity in this province. Many rivers and streams take their rise in these hills, but their courses are all short, and none of them are navigable. The soil is generally fertile, and produces abundant crops of grain.—Trapani (anc. *Drepanum*), the capital, is situated on a peninsula which extends into the Mediterranean, 16 m. N. N. E. from Marsala (anc. *Lilybæum*), and 46 m. W. S. W. from Palermo; pop. in 1856, 27,286. It is surrounded by walls and defended by several outworks. The streets are regular, but generally badly paved, and many of the houses are well built. There is a cathedral, about 40 churches, a palace where the provincial assemblies hold their meetings, a college, 2 seminaries, 2 hospitals, and some charitable institutions.—Drepanum (Gr. δρεπανη, a sickle, from the shape of the promontory) was founded by Hamilcar during the first Punic war, about 260 B. C., who transferred thither the inhabitants of the neighboring city of Eryx. It remained one of the chief strongholds of the Carthaginians throughout the war; off its port they gained a great naval victory under Adherbal in 249, destroying nearly the whole Roman fleet; and it was in attempting to raise its siege by the Roman consul Catulus in 241, that their ships under Hanno suffered, off the island of Favignana (anc. *Ægusa*), the total defeat which ended the war. Its name does not again appear in ancient history.

TRAPEZIUM and Trapezoid (Gr. *τραπεζα*, a table). In geometry, the first of these terms is a general name for a plane figure bounded by four straight lines, no two of which are parallel; the other is restricted to such a figure having two opposite sides parallel, differing in this respect from a parallelogram, in which each pair of opposite sides is respectively parallel.

TRAPPISTS, the name of the most rigorous among the religious orders of the Roman Catholic church, founded by the abbé de Rancé in the celebrated abbey of La Trappe, in the department of Orne. This abbey was founded about 1140 by the liberality of a count of Perche, and adopted the rule of the Cistercians in 1148, but subsequently so much degenerated that its inhabitants came to be called "the bandits of La Trappe." Rancé received the abbey as a benefice when only 12 years of age, and, having entered the order after a dissolute life, not only reformed its morals, but laid in it the foundation of a new and independent branch of the Cistercian order (1666), called, after the name of the abbey, the Trappists. (See Rancé.) The monastic rule is noted for its severity. The members rise in the morning at 2 o'clock, and 12 hours a day are devoted to devotional exercises, the remainder to hard labor, mostly in the field. No worldly conversation is allowed; when meeting, they salute each other with the solemn *Memento mori* ("Remember death"). Their scanty food consists of water and vegetables; meat, wine, and beer are entirely forbidden. They sleep on a board, with a pillow of straw; and they never undress, not even in case of sickness. Hospitality is earnestly recommended; but it is also enjoined to the members to observe, in the exercise of hospitality, as much as possible the customary silence of the order and the simplicity of its mode of life. Until the time of the French revolution the order of the Trappists spread but little, remaining confined to the abbey of La Trappe, one establishment in Tuscany, and one in western Germany. The revolution expelled them from La Trappe in 1791, and for more than 20 years the scattered members wandered through Switzerland, Germany, England, Spain, Russia, and North America, founding from time to time a number of new establishments, most of which they were after a few years again compelled to leave. In 1817 they returned to La Trappe, and soon founded a number of other establishments in France. The order was especially prosperous under the administration of the superior-general Geramb (after 1825), one of the few Trappists who have won a reputation for authorship. In 1828, and again in 1830, all the French establishments of the order were ordered by the government to be suppressed, but in neither case was the decree executed. In 1860 they had 15 abbeys in France, and a large establishment at Staoueli in Algeria, which receives an annual stipend from the government, and sustains a large agricultural school for young Arabs; there were also in the same year 3 houses in Belgium, 2 in Italy, 1 in Ireland, 1 in Turkey, and 3 in North America (New Haven in the diocese of Louisville, New Melleray in the diocese of Dubuque, and Tracadie in the diocese of Arichat, Canada); in all, 26 abbeys with about 2,000 members.—An offshoot of the order of Trappists is the congregation of "Trappist Preachers," founded about 20 years ago by the abbé Muard, at Avallon, France, which connects home missionary labors with the observance of a Trappist mode of life.—The first convent of Trappist nuns was founded in 1692 in France. In 1860 they had altogether 8 houses, of which one was in England (Stapehill in Dorsetshire), and the remainder in France.

TRAVANCORE, a semi-independent native state of Hindostan, subsidiary to the Madras presidency, occupying the S. W. extremity of the Indian peninsula, bounded N. by Cochin and Coimbatoor, E. by the Ghauts, which separate it from the British districts of Tinnevelly and Madura, and S. and W. by the Indian ocean; area, 722 sq. m.; pop. 1,011,824. The capital is Trivandrum; other chief towns, Quilon, Alleppey, Anjenga, and Kotar. The N. part of the coast is low and sandy, and bordered with extensive groves of cocoanut trees; but toward the S. extremity, which terminates in Cape Comorin, it assumes a bolder aspect. There is no harbor, but the roadstead of Alleppey is one of the best upon the Malabar coast. Travancore is well watered by several rivers, those of the N. part of the country flowing into "backwaters" or lagoons, which extend for a considerable distance nearly parallel with the coast. The mountains which form the E. boundary vary in height from 4,000 to 7,000 feet; and the tract lying between them and the coast is generally hilly till it approaches the neighborhood of the sea. During the S. W. monsoon, between June and September, heavy rains fall and cool the atmosphere; but at other seasons the climate is dry, and in the months of February, March, April, and May the weather is exceedingly hot. Pepper, cardamoms, ginger, cocoa and areca nuts, cinnamon, nutmegs, and rice are all cultivated; the last named yields two or three crops in the year. The wild animals resemble those of the province of Malabar. The horned cattle of Travancore are all small, and horses are not much used. There are but few manufactures; a little sugar is made, and some salt. The exports consist principally of pepper, ginger, various spices, dye stuffs, areca and cocoa nuts, timber, and dried fish.—Travancore is a portion of ancient Malabar, and the inhabitants and customs are similar to those found in that province. The rajah is a Hindoo; and the inheritance of the sovereignty, as well as that of all property, passes in the female line. The population includes about 170,000 Roman Catholic and Syrian Christians, and about half that number of Moplahs. Toward the middle of the last century the rajah of Travancore extended his territories to their present limits, but in 1790 he was obliged to call upon the British to assist him in preserving his dominions from the grasp of Tippoo Sultan; and by subsequent treaties he yielded up a good part of his sovereignty, and agreed to pay a large subsidy, in consideration of British protection.

TRAVERS, JULIEN GILLES, a French poet and miscellaneous author, born in Valognes, department of Manche, Jan. 31, 1802. After teaching in several provincial colleges, he became in 1832 principal of the college of Falaise. From 1842 to 1856 he occupied the chair of Latin literature at Caen. Beside several volumes of original poems, including *Les Algériennes* (1827), *Les distiques de Muret*, imitated in French verse (1834), *Deuil* (1837), and *Gerbes glanées* (1859), he has published an edition of the poetical works of Boileau, the *Vaux-de-Vire* of Oliver Basselin (1833), and a translation of the "Phœnix" of Cardinal Bona (1858); and he has edited since 1829 the *Annuaire de la Manche*, a valuable repertory of local history and statistics, and since 1840 the *Bulletin de l'instruction publique et des sociétés savantes de l'académie de Caen*, of which he became secretary in 1839.

TRAVIS, a central co. of Texas, intersected by the Colorado river; area, about 1,000 sq. m.; pop. in 1860, 8,080, of whom 3,136 were slaves. The surface is moderately hilly, and the soil very fertile. The productions in 1850 were 149,865 bushels of Indian corn, 18,637 of sweet potatoes, 41,102 lbs. of butter, and 234 bales of cotton. There were 2 newspapers, and 183 pupils attending public schools. Steamboats ascend the river to Austin, the capital of the county and of the state.

TREADMILL, or TREADWHEEL, an instrument of punishment, formerly extensively adopted in England and the United States, but now generally abandoned, from its injurious and depressing effect. The treadwheel was similar in construction to an ordinary water wheel, only that the buckets of the latter were replaced by stepping boards or planks, on which there was room for 10 to 20 men to stand in a line, the weight of whose bodies caused the wheel to revolve, and thus compelled them to step constantly from one stepping board to the next above it. A hand rail was provided, by taking hold of which the prisoner was prevented from being drawn down by the revolutions of the wheel, and a screen of boards above prevented his climbing it. The wheel was used for driving machinery. The rate of exertion maintained by the convicts depended upon the height of the steps and the velocity of the revolutions; the former varied from 7 to 9 inches, and the latter required an average of 45 steps per minute. To maintain this velocity, relays of men were necessary, as one gang could not continue the exertion more than 10 or 12 minutes at a time. After resting 5 or 6 minutes, they were able to resume their labor. The hours of labor were usually 10 per day, and a prisoner would be on the wheel about 6⅔ hours in that time. The number of feet of ascent per day ranged from 8,000 to 21,000.—The treadmill was introduced into England, in the bridewell at Bury, by William Cubitt, in 1818, and for some years was employed in most of the county prisons. In Coldbath-Fields prison females were put upon the wheel, but it was found to produce such injurious effects on their health, that it was after a time discontinued. It was introduced into the United States in 1823, and was first used in New York.—A similar contrivance was the crank machine, by which the prisoner was required to turn a crank to raise water, which was permitted to flow back into the reservoir from which it was drawn; this was adopted in the separate prisons, and a gyrometer out of the reach of the prisoner, but subject to the inspection of the keeper, revealed the number of revolutions made in a day.

TREADWELL, Daniel, an American inventor, born in Ipswich, Mass., in 1791. While still young he made his first invention, that of a machine for making wood screws. In 1818 he produced a printing press of a new construction, and went to England in 1819. He there conceived the construction of a power press, which on his return was completed in a year, and was the first press by which a sheet was printed on this continent by other than human power. It was widely used; and in New York large editions of the Bible were published by means of it at small cost. In 1822, in connection with Dr. John Ware, he established and conducted the "Boston Journal of Philosophy and the Arts." In 1825 he was employed by the city of Boston to make a survey for the introduction of water. In 1826 he devised a way of conducting railway transportation in both directions upon a single track by means of turnouts, which was the method upon which many of the principal railroads of the United States went into operation. In 1829 he completed a machine for spinning hemp for cordage, which was the first ever successfully used for that purpose; works capable of spinning 1,000 tons in a year were erected in Boston in 1831; and by machines furnished by him in 1836 to the Charlestown navy yard, all the hemp is still spun and the cordage made for the U. S. navy. From that time American cordage began to be exported. The machines were used in Canada, Ireland, and Russia; and one of them, called a circular hackle or lapper, has been generally adopted wherever hemp is spun for coarse cloth. In 1834 he became Rumford professor of technology in Harvard college. Soon afterward, perceiving the utility of cannon of a larger caliber than any in use, he devoted himself to that subject, and in four years reduced to practice his method of making cannon of wrought iron and steel. He executed a contract with the United States for 12 6-pounder field pieces, and the government also desired 32-pounders for the navy, and he went to work upon them. But the patronage of the government was not sufficient to warrant a continuance of the manufacture. The great objection to the Treadwell gun was its cost. To obviate this he made an important improvement on his first method of construction, for a description of which see Cannon. He determined by exact calculation, that a gun made in this way would be as strong as if made in his first method, would come within the reach of ordinary skill, and be about as cheap as the common cast iron gun. He described this new method in a memoir before the American academy in 1835, secured his invention by patent, and published an account of it in 1856. It is certain that 18 years before the gun was produced in England known as the Armstrong gun, Treadwell had made his; and that 15 years after his specifications had been published in Europe, and his English patent enrolled, and some years after that patent had been published in the volume of the "English Printed Specifications," Sir William Armstrong produced his gun, formed upon the same plan, and adding thereto rifling and breech-loading. Professor Treadwell believed that it would give us great superiority over all the European powers using the old ordnance, to use guns made in his method, with rifling added, and in 1860 went to Washington to urge this upon the government. In a pamphlet published in 1862 he relates the measures that he adopted, and his ill success. He resigned his professorship in 1845, but still resides in Cambridge.

TREASON, in general terms, any act of hostility against a state, committed by one who owes allegiance to it. There is one important difference in what may be called the form or manifestation of this crime, which seems to constitute a difference in its essence, and has led to some confusion of thought as to the crime itself, and as to the laws or proceedings which have for their end its prevention. This difference is between the crime as it may be committed against a monarch or against a republic. Where the power and majesty of a state are embodied in a personal sovereign, there treason against him is treason against the state; but where the state is not thus impersonated, the treason must be against the state itself, and cannot be committed against any person. The *crimen læsæ majestatis*, in all the ages of republican Rome, was regarded as a crime against the state, and not against its magistrates, excepting as they represented the state. The simple word *majestas* was often used as meaning this offence, although the whole expression of it was: *crimen læsæ, im-*

minutæ, *diminutæ*, or *minutæ majestatis*. At a later period, when the emperors, having first accumulated in their persons the higher magistracies of the republic, gradually and yet rapidly became despotic and irresponsible monarchs, while the language of the law remained almost unchanged for a considerable time, the crime itself came to be regarded as primarily a crime against the personal sovereign, and derivatively against the state. In Rome, as afterward in England, the power of the sovereigns to enlarge the scope of this crime, and accuse whom they would of it, was enormously abused. But in both of these countries it always remained, and in all civilized countries it must always remain, the highest of crimes, and more deserving of the severest punishment than any other; and for these reasons it needs to be most carefully limited, and to be guarded not only as to its extent, but as to the proof by which it may be established. The constitution of the United States (art. 3, sec. 3) declares that "treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort." This cannot be regarded as a definition of treason, so much as a limitation of it, and a declaration of what portion of the offences which had been at different times included within its meaning should be regarded as so included by our law. The word treason is used as a customary law term of well known significance; and indeed, in the most important cases which have arisen in the United States, it would seem that this provision of the constitution has but exchanged the burden of defining treason, for that of defining the levying war against a state and adhering to its enemies.—In order to show the true meaning of the word treason, we must go back to the Roman civil law, which on this point had an important influence on the English law. In the early days of Rome, the word *perduellio* (from *perduellis*, which is defined by Gaius as *hostis*) was used almost as a synonyme of *majestas*, and indicates the idea of hostility to the state as belonging to it. Although commonly spoken of as the equivalent of treason, *majestas* certainly had a wider extent of meaning and operation than treason ever had in its extremest abuse in England. Cicero says (using the word *majestas* here in its original sense): *Majestas est in imperii atque in nominis populi Romani dignitate.* Elsewhere, for the purpose of defining the criminal offence of *læsæ majestatis*, he says: *Majestatem minuere est de dignitate, aut amplitudine, aut potestate populi, aut eorum quibus populus potestatem dedit aliquid derogare;* and in this wide sense, *majestas* was applied to any maladministration in office of any magistrate. It became afterward much more like treason as it was in the worst periods of English history; and the abuse of it may be illustrated by some of the provisions of imperial law about the statues of the emperors. By some of these, it was declared that to repair their statues when going to decay, or to injure one accidentally and unintentionally, or even sell one if it had not been consecrated, was not a crime against the majesty of the state; but to melt one down after it had been consecrated, constituted this offence. The earliest punishment of the crime was perpetual interdiction from fire and water; the later, death, to persons of low condition by wild beasts or burning, to those of higher rank by the ordinary method of execution.—We find treason recognized and punished as a crime from the beginning of the common law; and always the cause of the crime was some act of hostility against the government by one who owed to it allegiance; in other words, it was the violation of the duty of allegiance. But during many ages the criminal law of England was unwritten, and lay in the determinations of judges who were removable at the king's pleasure, and who were often so corrupt that public justice was perverted into an instrument of remorseless tyranny. In the reign of Edward IV. an unfortunate punster, who kept an inn in London with the sign of the crown, said he would make his son heir of the crown; and for this offence he was hanged, drawn, and quartered. In the same reign an owner of deer, one of which was killed by the king while hunting, said, in a moment of anger, that he wished the horns of the deer were in the king's stomach; and for this he was put to death. But at a later period, when Russell and Sidney were slain through the instrumentality of a judicial trial for treason, this atrocious wickedness assumes at least a more dignified appearance. Indeed, during the whole of English history until the times of Cromwell, treason always had, in a greater or a less degree, the character of a political offence. At many periods the leading men of the age fell victims to it. Hence has arisen a feeling of compassion for the sufferers, and of doubt as to their guilt, which has had an important influence on the public estimation of the crime in that country, and to some extent in this. Another reason for some laxity of thought and feeling concerning this crime, is the extreme uncertainty of the earlier law as to its definition and limits. Thus, Glanville expressly identifies it with the *crimen læsæ majestatis;* Bracton includes within it the counterfeiting not merely of the king's seal, but of the king's money; and by a very current phrase it was supposed to embrace all "encroaching of (encroachment upon) royal power." So early as the 25th year of Edward III. an attempt was made to remedy this uncertainty by a statute defining treason, which was for the time an excellent law, although quite too wide in its scope. Among the principal offences here called treason were compassing the death of the king, queen, or prince, or levying war against the king, or adhering to the king's enemies; but all these offences were to be proved by some overt act. In some of the subsequent reigns this excellent provision was evaded by construction, or the statute was disregarded, or new ones made. Thus, by the 32d of Henry VIII. it was made high treason to accept, take, judge, or believe the king's marriage with Anne of Cleves as legal and valid. But the leading provisions of the statute of Edward III. are still the law of England, and the reasonable construction of its language by the courts of England has been generally followed by the courts of the United States in construing the provisions of our own constitutions and laws. By the 1st of Edward VI. the provision was introduced which we have copied, requiring, for the conviction of one charged with treason, two sufficient and lawful witnesses; but this provision was in many instances shamefully perverted. Thus when only one living witness could be found who would testify to Algernon Sidney's treason, Jeffreys decided that garbled extracts from his writings might be read as the other witness, and on this testimony he was convicted and executed; and no greater dishonor rests on the name of Bacon than that he assisted his master, King James, in corrupting the judges of the king's bench into a willingness to convict of treason one Peacham, a parish priest, on the evidence of a sermon which he had never delivered, and which was found by searching his study. Out of the many civil conflicts and commotions in England, and especially the wars of the roses, there grew one rule, still in force, and resting on the soundest justice and reason. During those ages of constant disturbance, when there were frequently more persons than one who claimed the crown, and, so far as they could, exercised royal authority, almost every person incurred the danger of treason, in case the claimant to whom he adhered was defeated; and for this cause, or on this pretence, multitudes of men of every rank perished on the scaffold. But from the obvious absurdity of exacting from every individual a sound, or rather a fortunate judgment as to the obscure and complicated grounds on which the claim to sovereignty often rested, it became and still remains a well settled rule, that no one incurs the guilt of treason by adherence to a king or government *de facto*, although that king or government has but the right of a successful rebel, and loses it all by a subsequent defeat.—In considering the crime of treason in the United States, we must remember that there may be treason against the United States, and also treason against any one of the states. Looking first to treason against the United States, the foundation of the law itself, and of our knowledge of it, must be the clause in the constitution already quoted; and as there is no common law of the United States, this clause would have remained inoperative but for the act of congress of 1790, chap. 36, sec. 1, whereby it was enacted, "that if any person or persons owing allegiance to the United States of America, shall levy war against them, or shall adhere to their enemies, giving them aid and comfort within the United States or elsewhere, and shall be thereof convicted, on confession in open court, or on the testimony of two witnesses to the same overt act of the treason whereof he or they shall stand indicted, such person or persons shall stand adjudged guilty of treason against the United States, and shall suffer death." When the courts came to the construction and application of that act, they very properly made use of the principles and the jurisprudence of the common law; and they could do this the better, because the clause of the constitution is substantially the same as a provision of the statute of Edward III., and the best ability of England had been carefully employed about that statute. For a judicial exposition of that clause and that statute, we must look to the trial of Burr, and of Bollman and Swartwout (4 Cranch, pp. 75 to 137), although these are not the only cases in which the same subject has been considered.—The first question is: What is a levying of war against the United States, within the meaning of the statute? In the first place, the levying of war must be actual; it must be carried out into some practical operation and effect. No intention, and no extent or thoroughness of preparation or of conspiracy for war, constitutes the crime of treason until the war actually begins. Some kind of force or violence, it is said, must be used. But it would seem that this force may be what the law would call constructive force; and it may be very slight; for it certainly need not be sufficient to accomplish either the general purpose of the war, or the particular effect proposed. But, if there be any overt act of war, then every one aiding and abetting this act of war, however remotely, does himself levy war, and commit treason. It must be difficult to determine always what this rule requires. Thus, Marshall declares, that if an army be actually raised for the avowed purpose of carrying on war against the United States, and subverting their government, the point must be weighed very deliberately, before a judge would venture to decide that an overt act of levying war had not been committed by a commissary or purchaser who never saw the army, but who, knowing its object and leaguing himself with the rebels, supplied that army with provisions; or by a recruiting officer, holding a commission in the rebel service, who, though never in camp, executed a particular duty required of him. Hence it would follow, that if there be an act of levying war against the United States, persons may be participators of that act, and of the crime which it constitutes, although they reside as far as possible from its actual locality. The prevailing rule of the criminal law, that there may be principals and accessories to a crime, has no application whatever to treason. We are warranted by the language of Chief Justice Marshall in saying, that if a rebellion were so extensive as to spread through every state in the Union, every individual concerned in it is not legally present at every overt act committed in that rebellion; nor can it be said that even the commander-in-chief of the rebel army, or the head of the organized rebellion, is legally present at every such overt act. But while a man may be actually absent, yet if he have counselled or procured the treasonable act, he is a principal traitor, not because he is legally present, but because in treason all are principals. This question of locality has yet another importance. A person charged with this crime can be tried only within the state or judicial district in which it is committed, and the alleged criminal has indeed a strict right to be tried by a jury within that state or district. A wide extent may be given to this rule, by the doctrine that in treason all are principals, as above stated; but it can apply only to those persons who would, in the locality in which they reside, be either principals or accessories if there could be accessories to this crime. For if a person commits his own act of treason in a certain locality, and is not connected with any one committed elsewhere, so as to be, in this way, a principal in the act, he can be tried only within his locality; and if the judicial tribunals of the United States cannot or will not perform their proper functions within that state or judicial district, he cannot be tried anywhere. It is certain, too, that the overt act which is alleged to be a treasonable act, must have been done with "a treasonable purpose." We have on this point high authority for saying, that if the object of the act be to prevent by force the execution of any public law of the United States, that is a treasonable purpose, for it aims at overthrowing the government as to one of its laws. So, if the purpose be to overthrow the government at one place, large or small, that is a treasonable purpose.—What, then, is adhering to an enemy, or, in the language of the constitution, giving him aid and comfort? It is perhaps impossible so to define these words as to make their meaning any plainer. But, again on high authority, this meaning may be illustrated thus: If a conspiracy to levy war against the United States be in actual operation anywhere within it, any citizen, residing anywhere else and at whatever distance, if he supply the rebels with arms or any munitions of war, with provisions to be used in support of the war or of the rebels while carrying it on, or money, or intelligence or information, and even if none of these things reach the rebels, he becomes a traitor in the place where he resides. So it would come under this branch of treason, if forts, castles, or ships of war were delivered to the enemy, or if the accused had joined the enemy's forces, though no battles or conflicts take place.—Of treason against one of the states of the Union, little need be said. It has been asserted, though never judicially, that there can be no treason in this country excepting against the United States. This point was taken in defence of the accused, in the trials which took place after the suppression of what is called the Dorr rebellion in Rhode Island. It was fully considered by the court and distinctly overruled; and it seems to be now certain that treason may be committed against any one of the states. As to what constitutes treason, the same principles would undoubtedly apply, whether the treason charged were committed against the United States or against any one of the states, qualified only by any special provisions of the constitution or law of that state. The crime is expressly recognized by the legislation of many of the states; and in New York, Massachusetts, Pennsylvania, and Virginia, and perhaps in other states, cases have occurred where the general principles of the law in relation to treason have been acknowledged and applied. It needs only to be added, that treason against a separate state can consist only in an act of hostility against the sovereignty of that state, as distinct from the sovereignty of the United States. There cannot be, we presume, an act of treason against the United States and any state jointly, or against two or more of the states jointly.—As all treason consists of hostility against a state by one who owes to it allegiance, so only one who owes this duty, in some way, may be a traitor. But it is held that this modified allegiance may be that of an alien residing in this country and enjoying the protection and advantages of its government. The allegiance of an alien, however, or the possibility of his becoming a traitor, ends with his residence in this country; while the duty of allegiance goes with a citizen wherever he goes; and wherever he may be, he becomes a traitor by hostility against the government in violation of this duty.—We have seen that no one can be convicted of treason except on the evidence of two witnesses; but with this exception, the trial for treason is conducted in all respects like any other criminal trial for a capital offence. If convicted, the traitor suffers death, by the ordinary means of execution. We have no remnant of that ferocious cruelty, which may have been necessary in any age or nation so barbarous as to have made it a part of its law. Until the 30th year of George III. the convict of treason forfeited his property to the crown, was drawn on a hurdle to the gallows, there hanged, then cut down, disembowelled, and his entrails burned before life was extinct; and the body was then beheaded and quartered. But, while it is difficult to believe that such cruelty could have been often practised, the recollection of these enormities, or of all the abuses of the law of treason, should not lessen our abhorrence of this enormous crime.

TREASURE TROVE (literally, found treasure), a term applied to money, coin, plate, or other forms of the precious metals, found hidden in the earth or any private place, and for which no owner or depositor can be discovered. By the common law of England such property becomes vested in the sovereign, if it appears to have been concealed with the intention of reclaiming it. In all other cases, as where circumstances show that the treasure was intended to be abandoned, it belongs to the finder, who by a special order in council is also entitled to the commercial value of ancient coins and other objects of antiquarian interest, under whatever circumstances they may be found. The civil law formerly gave the treasure trove to the finder; or if found on another man's land, it was divided between them; but the practice in continental Europe has in modern times been similar to that in England. During the middle ages treasure trove constituted an important source of revenue to the crown; but with the increased security of property the practice of burying money, so prevalent in troubled times, has in a great measure ceased, and the instances in which the sovereign is enabled to claim his prerogative are comparatively rare.

TREASURY, literally, a place or building in which money or other treasure is stored for safe keeping, but more generally understood as a department of government having control of the collection, management, and expenditure of the public revenue. In England the lord high treasurer, the third great officer of the crown, was formerly the sole head of the treasury; but since the time of George I. the duties of his office have been discharged by 5 lords commissioners, consisting of the first lord of the treasury, who is also the prime minister, the chancellor of the exchequer, and 3 junior lords. The departments immediately subordinate to the treasury are numerous and important, and the amount of patronage thereby thrown into the hands of the premier is more considerable than in any other branch of the public service. The first lord of the treasury is generally the leader of the ministerial party in parliament for the house in which he sits, and the chancellor of the exchequer assumes similar functions in the absence of his superior. Hence the term treasury benches applied to the seats occupied by the ministry. The treasury department of the United States is under the management of a secretary, an assistant secretary, a chief clerk, 2 comptrollers, 5 auditors, a treasurer, several assistant treasurers, and other officers, having in charge the fiscal concerns of the government.

TREBIZOND, a pashalic of Asiatic Turkey, bounded N. by the Black sea, E. by Kars, S. by Erzroum, and S. and W. by Sivas; extreme length about 220 m., breadth 50 m.; area, about 7,000 sq. m. The chief towns, beside the capital, are Keresoon (anc. Cerasus), Treboli (Tripolis), Rizah (Rhizus), and Batoom (Bathys). The scenery on the coast is remarkably beautiful. The mountains rise immediately from the sea to the height of nearly 5,000 feet, and are clothed with dense forests. The country is generally well wooded and mountainous, and has but little arable land. The principal rivers are the Tchoruk, on the E. frontier, and the Kharsat, neither very large. The climate is variable, being subject to cold winds, accompanied by rain and fog from the Black sea. There are several fertile valleys and well cultivated tracts, but the country does not produce sufficient grain for the consumption of the population. The inhabitants are a hardy, bold race, and the men always go armed. They are good marksmen, and each carries a rifle slung across his shoulders.—Trebizond, or Tarabozan (anc. *Trapezus*), the capital, is situated on the S. E. coast of the Black sea, in lat. 41° 3′ N., long. 39° 46′ E.; pop. about 50,000. It is divided into two parts, the Turkish and the Greek, the former surrounded by walls and separated from the latter by a ditch crossed by two narrow bridges, defended by fortified gateways. The most remarkable building is the citadel, which stands upon the flat top of a steep rock. The bazaars are extensive, and the public baths are constructed of marble. The anchorage is in a small open bay, and is only considered safe during the summer months; and at other seasons vessels lie at Platena, a roadstead about 7 m. W. from Trebizond. It is now considered the first commercial port on the Black sea, and, after Constantinople, in the Turkish empire. Five lines of steam vessels connect it with the principal ports of Asia and Europe, which in 1859 brought thither 49,036 passengers. An extensive overland trade is carried on with Armenia, Georgia, and Persia. The goods received from these countries consist of silk, wool, tobacco, wax, gall nuts, oil, opium, different sorts of drugs, honey, timber, carpets, and shawls, many of which are reëxported. The imports by sea comprise cotton cloths, glass, cutlery, firearms, and other manufactures, together with grain, iron, tin, spices, and the produce of tropical regions. The total trade has increased from about $6,000,000 in 1833 to $38,000,000 in 1859; the imports in the latter year amounted to $18,648,650, and the exports to $19,490,261; arrivals and departures, 626, tonnage 283,174.—Trapezus was founded by a colony from Sinope, and was a flourishing town when Xenophon arrived there on his retreat from Persia. It became subject to the Romans by conquest from Mithridates. The emperor Trajan constructed a mole to improve the port, and made it the capital of eastern or Cappadocian Pontus. During the reign of Gallienus it was plundered and nearly destroyed by the Goths, but in the time of Justinian it had completely recovered, and was made the capital of a province which included Pontus and some part of Armenia. In 1204 it became the seat of an independent branch of the Comnenus family (see Alexis, vol. i. p. 334), who afterward called their territory the empire of Trebizond, and held it through a succession of 20 sovereigns till 1462, when it succumbed to the power of the Turks.

TREDGOLD, Thomas, an English civil engineer, born at Brandon, near Durham, Aug. 22, 1788, died in London, Jan. 28, 1829. At 14 years of age he was apprenticed to a cabinet maker at Durham, and in 1808 went to Scotland, where he worked 5 years as a journeyman carpenter and joiner, and by his excessive devotion to study at night and in the intervals of labor impaired his constitution. In 1818 he went to London, and entered the service of a relative, William Atkinson, architect to the ordnance, with whom he remained for several years, while continuing his studies, and in 1828 commenced as civil engineer on his own account. Beside numerous articles in periodicals, he published "Elementary Principles of Carpentry" (4to., London, 1820); "A Practical Essay on the Strength of Cast Iron and other Metals" (8vo., 1821); "The Principles of Warming and Ventilating Public Buildings, Dwelling Houses," &c. (8vo., 2d ed., 1824); "A Practical Treatise on Railroads and Carriages" (8vo., 1825); "Remarks on Steam Navigation, and its Protection, Regulation, and Encouragement" (1825); and "The Steam Engine, comprising an Account of its Invention and progressive Improvement, with an Investigation of its Principles," &c., the last edition of which (1862) is enlarged to 4 vols. 4to., illustrated with 226 steel plates and 164 woodcuts.

TREE. See ARBORICULTURE.

TREE FROG, the name of the batrachian reptiles of the family *hyladæ*, distinguished from common frogs (*ranidæ*) by having the ends of the fingers and toes dilated into flattened disks or suckers, which enable them to lead their peculiar arboreal life. They are of more elegant form, smaller size, brighter colors, and more active habits than the *ranidæ*, and are lively during the day; they feed on insects, which they pursue on bushes and trees, stealing toward them or suddenly springing and swinging upon them; they climb like the geckos among lizards, and by the same mechanism; the lower surface of the disks is endued with a viscid secretion, by means of which they can walk with the body suspended from the under parts of leaves and other smooth bodies; the skin is mostly smooth upon the back, but on the abdomen and inside of legs thickly studded with small warts or tubercles. They possess to a remarkable degree the faculty of changing color, by the modifications of the contents of the pigment cells under the skin, no doubt a provision to enable them to elude their numerous enemies. They are very clamorous, and particularly noisy at the approach of rain; in winter they bury themselves in the mud at the bottom of pools; they breed in the spring, depositing their eggs in the water. They are frequently called tree toads, and their French name is *rainettes*. The species are numerous, especially in America; only one is found in Europe, and that also occurs in N. Africa and Asia; no fossil traces of the family have been discovered, according to Pictet.—The common tree frog of North America (*hyla versicolor*, Le Conte) resembles a toad in form, but is more flattened; body short and warty above, the color varying from pale ash to dark brown, with several large irregular blotches of greenish brown, white and granulated below, and abdomen yellowish near the thighs; the colors vary at the will of the animal. The head is short and rounded, the mouth large, with teeth on upper jaw and vomer; eyes large and brilliant, the iris bright golden; there are 4 fingers and 5 toes, both ending in viscous pellets, the former distinct, but the latter webbed for ⅘ of their length. It is about 2 inches long, and is found abundantly in the northern and middle states, and as far west as the Mississippi; it is generally seen on decaying trees and about old fences of wood or stone, overgrown with mosses and lichens, the color of which it so nearly resembles that it is very difficult to detect; it is very noisy in spring and summer toward evening, especially in cloudy weather, and its liquid and abruptly terminating note must be familiar to all residents in the country; the secretion of the skin is copious and very acrid. This species in the southern states is replaced by the green tree frog (*H. viridis*, Laur.; *calamita Carolinensis*, Penn.), which is bright green above, yellowish white below, with a straw-colored lateral line extending from the upper jaw over the shoulder and along the side; it is shorter and more slender than the northern species, and is most commonly seen about broad-leaved plants, especially Indian corn, the color of the leaves of which it greatly resembles, concealed during the heat of the day, but coming out morning and evening and becoming very active and noisy; the single note is clear and bell-like; the food consists of insects, particularly the common fly, to seize which it leaps a foot or more; on the ground when in search of water leaps of 8 or 10 feet are sometimes made. The *H. squirella* (Daud.), sometimes improperly called the peeping frog, is olive-green above, with brown blotches, a transverse dusky band between the orbits, and whitish below; it is about 1¼ inches long, not found N. of Virginia, and has remarkable powers of changing color. Several other species are described by Holbrook and more recent authors, from the southern and south-western states and territories. The tree frog of Europe (*H. arborea*, Linn.) much resembles the green species of North America, and the latter was considered by Laurenti a variety of his *H. viridis*; it is spread throughout Europe, except in Great Britain.—In the genus *acris* (Dum. and Bibr.) the locomotive disks are less developed and the limbs more slender than in *hyla*, and there are teeth on the palate instead of the vomer. The *A. gryllus* (Dum. and Bibr.), or Savannah cricket, is about 1½ inches long, with an elongated pointed head, a triangular dusky spot between the orbits; body ashy above, with a green and sometimes reddish dorsal line, and 8 oblong black spots margined with white on the sides. It is a lively species, constantly chirping like a cricket, even in captivity; it frequents the edges of pools, and is sometimes found on the leaves of aquatic plants; it may easily be domesticated so as to take food from the hand; it makes immense leaps; it occurs from southern New England to the gulf of Mexico; it is intermediate between the *ranidæ* and *hylada*, having the aquatic habits of the former and the method of watching for its prey of the latter; in consequence of the smallness of the disks it cannot adhere to the under surface of smooth bodies.—In the genus *hylodes* (Fitz.) the palate is toothed, and the slender fingers and toes are free, with small disks. Pickering's tree frog (*H. Pickeringii*, Holbr.) is nearly an inch long, with short head and yellowish brown body, with dusky rhomboidal spots and lines, sometimes like the letter X on the back; pale flesh-colored below, tinged with yellowish on the throat. This is the true peeping frog, the noise being made by both sexes; in summer they cease to be vocal, retiring from the pools where the eggs were laid to the woods, where they live on trees, hopping about on the branches in search of insects, and occasionally uttering a shrill whistle. It is found in the New England and middle states, and was named in honor of Dr. Charles Pickering, who obtained it abundantly in the vicinity of Salem, Mass. The chestnut tree frog (*H. lineatus*, Dum. and Bibr.) is about 2 inches long, brownish and sometimes bluish above, with a yellowish white line from the nose to the arm pit; below bluish white. It is a native of Cayenne; the young adhere to the back of the mother, without the assistance of the dorsal pits of *pipa* (see TOAD); though having the gills and swimming tail of the tadpole, they are often found on the parent's back at a considerable distance from water. In *notodelphys ovifera* (Weinland), from Venezuela, a dorsal fissure in the female leads to two lateral pouches in which the eggs are carried, and in which the embryo is developed until the feet are produced.—In the genus *dendrobates* (Wagler), which seems to connect this family with the toads, there are no teeth in the upper jaw, but the fingers and toes end in disks, enabling the species to lead an arboreal life. The *D. tinctorius* (Wagl.) was so named from the statement that the natives in South America are in the habit of pulling out the feathers from young green parrots, and rubbing the blood of the batrachian on the bare place, it being believed that the new feathers there growing will be red or yellow; it is about 1½ inches long, ferruginous above with 2 longitudinal white stripes.

TREFOIL. See CLOVER.

TREMBECKI, STANISLAW, a Polish poet, born in the palatinate of Cracow about 1724, died at Tulczyn, Dec. 12, 1812. He travelled extensively, became intimate with the principal literary men of France, fought some 30 duels on account of love affairs, was noticed for peculiarities in dress, diet, and manners, served for some time as chamberlain to King Stanislas Augustus, and spent the last years of his life at Tulczyn, a country seat of Count Felix Potocki. His miscellaneous poems have appeared in various collections, the last edition being that of Leipsic, 1836, in 2 vols.

TREMBLEY, ABRAHAM, a Swiss naturalist, born in Geneva in 1700, died in 1784. He was tutor to the children of Lord Bentinck, English minister at the Hague, and afterward to the duke of Richmond, with whom he visited Germany and Italy. On his return to Geneva in 1757 he was appointed a member of the great council. In his *Mémoires pour servir à l'histoire d'un genre de polypes d'eau douce, à bras en forme de cornes* (Leyden, 1744), he demonstrated that these creatures, which had previously been classed in the vegetable kingdom, were really animals. He left also several works of a religious character.

TREMPELEAU, a W. co. of Wisconsin, bounded S. W. by the Mississippi river, intersected by Trempeleau Mountain river, and drained also by Black and Buffalo rivers; area, 684 sq. m.; pop. in 1860, 2,560. The surface is level and the soil fertile. Capital, Galesburg.

TRENCH, RICHARD CHENEVIX, D.D., a British clergyman and author, born in Dublin, Sept. 9, 1807. He is the second son of Richard, brother of the first Lord Ashtown in the Irish peerage, and of Melesina, granddaughter of Dr. Richard Chenevix, formerly bishop of Waterford. He was graduated at Cambridge in 1829, and after a few years of travel took orders, became a country curate, and published two volumes of poems respectively entitled "Sabbation, Honor Neale, and other Poems," and "The Story of Justin Martyr." These, being favorably received, were succeeded by "Genoveva," "Elegiac Poems," and "Poems from Eastern Sources." In 1841 he became curate to the present bishop of Oxford, then at Alverstoke, and in 1845 was presented by Lord Ashburton to the rectory of Itchenstoke. He was appointed in 1845 examining chaplain to the new bishop of Oxford, and was also Hulsean lecturer at Cambridge during 1845–'6, and in 1847 was appointed theological professor in King's college, London. On the death of Dr. Buckland in 1856, he was appointed by Lord Palmerston dean of Westminster, which dignity he now holds. Dean Trench has acquired a high reputation as a writer on theological subjects, and as a philologist and poet. His chief religious works are: "Notes on the Miracles," "Notes on the Parables," "The Sermon on the Mount," "Sacred Latin Poetry," "Saint Augustine as an Interpreter of Scripture," "Sermons on the Divinity of Christ," and "Commentary on the Epistles to the Seven Churches in Asia" (1861). His principal philological works are: "On the Authorized Version of the New Testament;" "On the Study of Words," a series of lectures (1851), of which the 9th English and 22d American editions were published in 1861; "On the Lessons in Proverbs," "Synonymes of the New Testament," "English Past and Present," and "A Select Glossary of English Words used formerly in Senses different from their present." He has also written a work entitled "Calderon, his Life and Genius, with Specimens of his

Plays," and edited "The Remains of the late Mrs. Richard Trench," his mother (London, 1862).

TRENCK, Franz von der, baron, an Austrian military leader, born in Reggio, Calabria, Jan. 1, 1711, committed suicide in prison at Brünn in 1749. In his 17th year he entered the Austrian military service, but was obliged to leave it in 1738 on account of his insubordination and excesses, and became captain in a Russian hussar regiment. Twice condemned to death for serious violations of discipline, he was saved by Marshal Münnich, and after 6 months' penal labor retired to his estates in Slavonia. In 1740, on the breaking out of the war of the Austrian succession, he was permitted by the empress Maria Theresa to raise a corps of Pandoors at his own expense, which soon numbered 5,000 men. At the head of these he served in the war of the succession and in the 7 years' war which followed, and distinguished himself by his courage and military capacity, but still more by his cruelty and rapacity. Having at length, while undergoing trial by court martial, throttled one of the judges and attempted to throw him out of a high window, he was condemned to perpetual imprisonment in the fortress of Brünn in Moravia, where he poisoned himself. He possessed astonishing physical strength, united with a disposition of extraordinary ferocity. His autobiography appeared at Vienna in 1807, under the title of *Merkwürdiges Leben und Thaten des Freiherrn Franz von der Trenck;* and his life has been written by Hübner, under the title of *Franz von der Trenck, dargestellt von einem Unparteiischen, mit einer Vorrede von Schubart* (3 vols., Stuttgart, 1788).—Friedrich von der, baron, a German soldier and adventurer, cousin of the preceding, born in Königsberg, Feb. 16, 1726, guillotined in Paris, July 25, 1794. He was educated at the university of Königsberg, was admitted in 1742 into the body guard of Frederic the Great, and when only 18 years old was selected to instruct the Silesian cavalry. During the following winter he engaged in a secret intrigue with the princess Amelia, second sister of the king, and to this circumstance, it has been thought, his after misfortunes were owing. In the campaign of 1744 he served with great distinction, acting as the adjutant of Frederic, with whom he became a special favorite. On his return to Berlin his amour came to light, or at least was suspected by the king, and Trenck was arrested and confined for several weeks for having been a few minutes late on parade. In the campaign of 1745 he again distinguished himself; but having corresponded on private affairs with his cousin Baron Franz, then in the Austrian service, he was cashiered, and without trial conducted to the fortress of Glatz, where he was imprisoned for more than a year. After several desperate efforts he escaped, went to Vienna, and exerted himself to procure the pardon of his cousin, who was then undergoing a trial. His efforts were ungratefully received by the baron, and led to much trouble and a number of duels. At Nuremberg he met the Russian general Lieuwen, who was marching with an army to the Netherlands, and who persuaded him to enter the Russian service, and gave him a company of dragoons in the Tobolskoi regiment. After the peace he was received with much favor at Moscow, though his advancement was retarded by the efforts of Goltz, the Prussian ambassador. His cousin, having died, left him heir to his estate, but on condition that he should become a Catholic and should serve only the house of Austria. To secure this he went to Vienna in 1750, but out of all this bequest and the property of his uncle he received only 63,000 florins, with which he purchased the lordship of Zwerbach. By the Austrian court he was made captain of cavalry in the Cordova cuirassiers. In March, 1754, his mother dying, he made a journey to Dantzic to settle some family affairs, and was there apprehended by the Prussian authorities, carried to Berlin, and thence taken to Magdeburg. There he was confined in a dungeon in the citadel. His apartment was in a casemate, the fore part of which was 6 feet wide and 10 feet long, and was divided by a party wall. He was at first not put in irons, but a desperate effort to escape caused him to be removed, May 27, 1755, to a cell in the Star fort, which was made especially for his confinement. Enormous chains were fixed to his ankle at one end, and at the other to a ring fastened in the wall about 3 feet from the ground. A huge iron ring of a hand's breadth was riveted around his naked body, from which hung a chain fixed into a thick iron bar 2 feet in length, at each end of which was a handcuff. The dungeon was built in the ditch of the fortifications, and when Trenck entered it had been finished only 11 days, so that during the first 3 months he was kept constantly wet by the water dropping from the moist lime and plaster. Even under these circumstances he nearly succeeded in making his escape. In 1756 a massive iron collar was put around his neck and connected with the chains of the foot by heavy links. In this condition he lay imprisoned until Dec. 24, 1763, enduring sufferings of a most terrible character, and repeatedly making the most daring attempts to free himself. On that day he was released by order of Frederic, and in Jan. 1764, was carried to Prague, where he endured renewed persecutions from the men who had control of his estates. Disappointed of preferment at the Austrian court, he retired to Aix la Chapelle, married there in 1765, and lived for several years in peace, occupying himself in writing a series of periodical essays, called *L'ami des hommes*, in which he advocated opinions of a liberal character, and in particular attacked the Roman Catholic church. In 1767 appeared his poem of "The Macedonian Hero," which gave him considerable reputation in Germany. He also engaged in the wine trade, in which he was very successful at first, but once while in London was defrauded to so large an amount that he gave up the business. From 1774 to 1777 his time was spent chiefly in travelling through England and France; and in the latter country he became intimate with Dr. Franklin, then American minister, and the counts St. Germain and De Vergennes, who made him advantageous proposals to go to America, which he was prevented from accepting by his affection for his family. The landgrave of Hesse-Cassel also offered him a commission in the army going to America to assist the British, which he refused, saying: "My heart beats in the cause of freedom only; I will never assist in enslaving men. Were I at the head of your brave grenadiers, I should revolt to the Americans." Subsequently he retired to his estate at Zwerbach, and spent several years in agricultural pursuits; but his property having been entirely ruined by floods and storms, he repaired his broken fortune by publishing a collection of his works and a history of his life. These gained him money and reputation, especially the autobiography, which was extraordinarily successful. After the death of Frederic in 1786 the confiscation of his estates was annulled, and he was permitted to return to his native country. Here he might have lived in quietness, but at the breaking out of the French revolution his restless spirit drove him to Paris, where he was arrested by the committee of public safety and put to death on the charge of being a secret emissary of the king of Prussia.

TRENT, a river of England, which rises in Staffordshire, 4 m. N. from Burslem, flows through the central part of the island, and near Burton-on-Strather, Lincolnshire, joins the Ouse to form the estuary called the Humber, which falls into the North sea between Spurn Head in Yorkshire and Donna Nook in Lincolnshire; total length of the Trent and Humber, 190 m. Its course is very circuitous, but is in a general N. E. and N. direction to its junction with the Ouse, from whence it flows easterly for about 40 m. to the sea. It is navigable as far as Gainsborough for vessels of 200 tons, and to Burton-on-Trent for barges of 25 tons. Its chief tributaries beside the Ouse are the Sow, Tame, Soar, Devon, Blyth, Dove, and Derwent; and it is connected with several other rivers and navigable waters by a series of canals.

TRENT (Ital. *Trento;* Ger. *Trient;* anc. *Tridentum*), a walled town of Austria, in the Tyrol, capital of a circle of the same name, situated on the left bank of the Adige, 13 m. N. N. E. from Roveredo, and 72 m. N. W. from Venice; pop. about 15,000. It stands in a small and very beautiful valley among the Alps, and from its elevation the climate is exceedingly cold in winter, while the reflection of the sun's rays from the surrounding mountains makes it remarkably hot in summer. The streets are mostly wide and well paved, and the houses are in the Italian style and generally well and regularly built. It has a cathedral built entirely of marble in the Byzantine style in 1212. The church of Santa Maria Maggiore is built of red marble, and is interesting as the place where the celebrated council of Trent held its meetings. The manufactures are not important, but it is one of the seats of the transit trade between Italy and Germany.—Tridentum is supposed to have been founded by the Rhætians of Etruria. The Romans colonized it, and on the decline of that empire it passed successively into the hands of the Cenomani, Goths, Lombards, and dukes of Bavaria. During the middle ages it became a free imperial city under its bishops, who were princes of the empire with a vote in the diet at Ratisbon until 1802, when its government was secularized.

TRENT, Council of, the last œcumenical council of the Roman Catholic church. The first occasion for an œcumenical council in the 16th century was furnished by Luther and the Protestant princes, who appealed from the decision of the pope to a council. This appeal was supported by the Catholic princes, and the emperor Charles V., at the diet of Ratisbon, promised to induce the pope to convoke the council. Three popes, however, Leo X., Adrian VI., and Clement VII., died before the demands of the Germans were complied with. Paul III. appointed it to convene at Mantua, May 27, 1537; but when the duke of Mantua objected, Vicenza was selected. The war between the emperor and the king of France, and the conference between Catholics and Protestants at Ratisbon in 1541, caused new delays. At length Paul III. convoked it for Nov. 1, 1542, but on account of the war with France again put off the day of opening to March 15, 1545. The actual opening, owing to the tardy arrival of bishops and ambassadors, did not take place until Dec. 18, 1545. The objects of the council were to effect a reformation of the church, to define more explicitly the impugned doctrines of the church, and, if possible, to induce the Protestants to return to the old faith. At the 2d session (Jan. 7, 1546) the council fixed the mode of transacting business. The discussions and deliberations were to take place in private congregations; subsequently general congregations were to draft the resolutions, which finally were to be promulgated in public sessions as decrees. In the 3d session (Feb. 4) the Nicene creed was read and declared to be the basis of the further proceedings. In the 4th session (April 8) tradition was declared to be equally with the Bible a rule of faith; the Apocrypha of the Old Testament were included in the canon of the Bible; the Vulgate was proclaimed to be the authentic version of the Bible, and the church its only legitimate interpreter. In the 3 following sessions (June 17, 1546; Jan. 13 and March 8, 1547), the Catholic doctrines of original sin, justification, and the sacraments were defined, and an anathema pronounced upon all who rejected these doctrines. In the 8th session (March 8), 38 of the 56 bishops present, together with the papal legate, decreed, on the ground of being exposed at Trent to the plague, to adjourn to Bologna, notwithstanding the decided opposition of the emperor, at whose request 18 German and Spanish bishops remained at Trent. At Bologna, where 6 archbishops, 32 bishops, and 4 generals of religious orders were present, the 9th and 10th sessions were held (April 21 and June 2); but, at the express order of the pope, who had some apprehensions of a schism, no decrees were promulgated, except decrees of prorogation. As the emperor could not be prevailed upon to recognize the council of Bologna, the council was indefinitely prorogued by a bull of Pope Paul III., dated Sept. 17, 1549. The pope died in Nov. 1549, and on May 1, 1551, the council was reopened at Trent by order of his successor Julius III. France protested against the continuation, and all the French bishops and theologians withdrew. In the succeeding transactions the Jesuits Lainez and Salmeron, who were sent to the council as papal theologians, took a leading part. There appeared also representatives from the Protestant princes of Würtemberg and Brandenburg, and even Melanchthon was summoned there by order of the elector Maurice of Saxony; but it was found impossible to effect a reunion, and soon the outbreak of a new war of the Protestant princes against the emperor caused the assembled fathers (April 28, 1552) to suspend their deliberations. During this period, extending from the 11th to the 16th session, the doctrines of the eucharist, of confession and extreme unction, and two reformatory decrees on the jurisdiction of the bishops, were promulgated. Paul IV. was anxious to assemble the council at Rome, but Pius IV. consented to its reopening at Trent, which took place on Jan. 18, 1562, through the cardinal legate Prince Hercules Gonzaga of Mantua. France and the German emperor demanded very urgently a thorough reformation, and in particular the concession of the cup to the laity, and the abolition of celibacy and fasting; but their proposition was voted down. On Nov. 13 the cardinal of Lorraine arrived, with 14 bishops, 3 abbots, and 18 theologians from France, and presented in the name of his nation 34 reformatory articles, but subsequently abandoned their advocacy. On the question whether the dignity and rights of the bishops are of papal or of divine origin, the bishops found it impossible to come to an agreement, and it was consequently left undecided. Decrees were adopted ordering an index of prohibited books to be made, and defining the doctrines of the mass, ordination, the hierarchy, marriage, celibacy, purgatory, the veneration of saints, relics, and images, monastic vows, indulgences, and fasting and abstinence. A number of "reformatory" decrees were also passed, the most important of which enjoins the establishment of theological seminaries. The close of the council was hastened by a serious sickness of the pope, and his fear that his death might lead to a schism. It took place on Dec. 4, 1563, at its 25th public session. The decrees were signed by 255 members, consisting of 4 legates, 2 other cardinals, 3 patriarchs, 25 archbishops, 168 bishops, 39 representatives of absent bishops, 7 abbots, and 7 generals of religious orders. An authentic copy was also signed by the ambassadors of the secular governments, with the exception of the ambassador of Spain, who was without instruction, and the ambassador of France, who was absent. The decrees were confirmed by the pope, with the unanimous consent of the cardinals, in the consistory of Jan. 26, 1564; but the pope reserved to himself the right of explaining obscure or controverted points. The council was accepted unconditionally by most of the Italian states, by Portugal, Poland, and the German emperor; with a reservation of the royal prerogatives by Spain, Naples, and the Netherlands; with some exceptions by Switzerland and Hungary; and only so far as respects doctrines by France. The "Canons and Decrees" of the council were printed by Aldus (Rome, 1564). The "Catechism," an authorized summary of the faith drawn up by order of the council, appeared at Rome in 1566, and the collection of documents relating to its history was edited by Le Plat (7 vols. 4to., Louvain, 1781). The first complete history of the council was written by the Servite monk Paolo Sarpi (London, 1619; English translation by Brent, London, 1676), in a spirit of decided opposition to the papal court. Against him wrote the Jesuit Pallavicino (2 vols., Rome, 1636–'7). A work on the discrepancies of both has been published by Dr. Brischar (2 vols., Tübingen, 1843). Mendham's "Memoirs of the Council of Trent" (London, 1834) contains extracts from 28 volumes of manuscripts collected in Italy by Lord Guilford. The publication of the original acts and the diary of the council, by Augustine Theiner, prefect of the Vatican library, has been promised.

TRENTE-UN. See ROUGE ET NOIR.

TRENTON, a city and the capital of New Jersey and of Mercer co., situated on the left bank of the Delaware river at the confluence of Assunpink creek, and at the head of steamboat navigation, 30 m. N. E. from Philadelphia, and 57 m. S. W. from New York; pop. in 1860, 17,221. Its situation on the Delaware commands a fine view of the river and the fertile region on the W. bank. The city is regularly laid out, and lighted with gas, and has many elegant stores and residences. Main street is the principal business thoroughfare, and State street has the greatest number of fine residences. Assunpink creek divides the city into nearly equal parts. The 3d, 4th, and 6th wards lie south of the creek, and the two first named formerly composed the borough of South Trenton, which was united to Trenton in 1851. The 6th ward, formerly Lamberton, was annexed to the city in 1856. Water is raised from the Delaware to a reservoir N. of the city. The capitol is a handsome stone building, 100 feet by 60, stuccoed in imitation of granite. The county court house is in South Trenton, and is a fine building of brick, stuccoed. There is also a good town hall. Trenton also contains the state lunatic asylum, founded in 1848, and having accommodations for 325 patients; the state normal school, established in 1855, and having extensive buildings admirably adapted for its purpose, with 100 pupils in 1860; and the state penitentiary, which on Jan. 1, 1860, had 317 inmates. There is a state library of 8,000 volumes, beside a valuable law library, and a public library of about 2,000 volumes. There are 2 banks, each with a capital of $850,000, and 22 churches, viz.: 2 Baptist, 3 Episcopal, 2 Friends', 2 Lutheran, 7 Methodist, 4 Presbyterian, and 2 Roman Catholic. Five newspapers are published in the city, 3 of which are daily. There are 2 wooden bridges over the Delaware opposite the city, one 1,100 feet long, built about 1810, and crossed by the Philadelphia and Trenton railroad, and the other about 1,300 feet long, completed in 1860. The Delaware and Raritan canal passes through the city, forming a water communication with Philadelphia and New York, and, by the navigable feeder of the canal, with Lambertville and New Hope, about 18 m. N. Trenton is connected with Philadelphia by the Philadelphia and Trenton and Camden and Amboy railroads, and with New York by the Camden and Amboy and New Jersey railoads. The Belvidere Delaware railroad connects with the Camden and Amboy road at this point; at Easton, 56 m. N. of Trenton, it connects with the Lehigh Valley railroad, and only awaits the completion of a short branch road from Belvidere to connect it with the Lackawanna and Western road at the Delaware Water Gap. The city has 4 iron founderies; a locomotive and machine factory, now (1862) engaged in casting and finishing large guns; 2 wire factories; a wire rope factory and a rolling mill, both the largest of their kind in the United States; a manufactory of edged tools, swords, &c.; a malleable iron foundery; 2 manufactories of granite or white porcelain ware, and 4 of yellow and Rockingham earthenware, which together make about half the ware of these descriptions produced in the United States; a manufactory of terra cotta, and one of fire brick; a large cotton and woollen manufactory, 4 paper mills, 3 flouring mills, 2 steam saw mills, 2 manufactories of bows, bent felloes, shafts, sleigh runners, &c., and 2 tanneries. A large number of musket and rifle barrels are now made in the city, and a manufactory of cannon, rifles, muskets, swords, projectiles, &c., is about (April, 1862) to commence operations. —The first settlement in the vicinity was made about 1680, and was named in 1720 in honor of Col. William Trent, speaker of the house of assembly. It was selected as the capital of New Jersey in 1790, and incorporated as a city in 1792. On the night preceding Dec. 26, 1776, Gen. Washington crossed the Delaware river at McConkey's ferry, and attacked the Hessians, who were encamped in Trenton, surprising and routing them completely, taking about 1,000 prisoners, 6 brass field pieces, 1,000 stand of arms, and 4 standards. The Hessians numbered about 1,500, and 36 were killed in the skirmish, while the American loss was but 4. The force of the enemy in the vicinity being superior to Washington's, he returned to his camp on the other side of the Delaware on the night of the 26th. In 1788, Washington, while on his way from New York to Mount Vernon, was received with a triumphant welcome on the bridge over the Delaware at this place.

TRENTON FALLS, a post village of Oneida co., N. Y., on West Canada creek, 15 m. N. E. from Utica. It is principally noted for its falls, 6 in number, occupying at intervals a ravine 2 m. long, with an aggregate descent of 312 feet. The cascades are exceedingly beautiful. High walls of rock, sometimes reaching 150 feet, confine the stream, which is very rapid, through the greater portion of the falls. The village, a short distance below, contains a church, a large hotel, and about 20 houses. It is connected by railroad with Utica.

TRENTOWSKI, Ferdinand Bronislaw, a Polish philosopher, born near Warsaw in 1808. He studied in Lukow and at the university of Warsaw, was for some time teacher of the Latin language and of Polish history and literature at the gymnasium of Szczucin, after the Polish revolution of 1830-'31 resorted to the German universities of Königsberg, Heidelberg, and Freiburg, and finally established himself as *Docent* at the last named place, making the German philosophy the subject of his critical examination. His principal writings, in German, Latin, and Polish, are: *Grundlage der universellen Philosophie* (1837); *De Vita Hominis Æterna* (1838); *Vorstudien zur Wissenschaft der Natur* (1840); *Chowanna czyli system pedagogiki* (1842); *Stosunek filozofii do cybernetyki* (1843); *Myślini czyli loika* (1844); and *Demonomania* (1844; 2d ed., 1854).

TREPAN, and Trephine (Gr. τρυπαω, to perforate), two surgical instruments used for removing portions of bone from the skull or other parts of the bony structure. The first was an instrument like a gimlet, to which was attached a crown or cylinder with saw teeth on its lower edge, and which was worked by a rotatory motion till it perforated the bone. Several different sizes of these cylinders were furnished by the instrument makers. The trephine is an instrument of later invention. Like the trepan it has a cylindrical saw, but no gimlet. A sharp steel point called a centre pin, which can be pressed into the bone until the saw has made a groove for itself, passes down the centre of the instrument, and is removable by the operator as soon as the groove is made. The cutting is accomplished, not as in the trepan by a rotatory movement, but by semi-rotation, as in boring with an awl. The method of trephining is as follows: The point for the operation being determined, a crucial incision is made down to the bone, and the periosteum being dissected up, the trephine is applied, the centre pin being removed as soon as the track of the instrument is fixed, and the instrument itself raised every few strokes in order to see that it is not cutting through on either side, upon the tissues below. The greatest danger is when the circular piece is nearly separated; and some operators raise the cut portion by means of the elevator, rather than permit the instrument to divide it completely. The spicula of bone which may remain around the orifice are carefully removed by means of forceps. Trephining has been considered as indicated when there is a fracture of a portion of the skull, from a fall or blow with a blunt instrument, in order to elevate the depressed portion; in some cases of concussion, where there is reason to believe that the inner table of the skull is fractured at the opposite side of the head, and is producing irritation of the brain; in cases where extravasation of blood has taken place under the meninges of the brain from injuries or disease, or where purulent matter has accumulated under the meninges; in caries affecting the bones of the skull, the sternum or breast bone, or the tibia; and in some cases of a collection of purulent matter under the sternum. During the middle ages, in the "heroic" period of surgical practice, trephining was one of the most common operations of surgery, and thousands went to their graves with only a part of the bony covering of the brain which they originally possessed, and often died from inflammation of the membranes, the consequence of the empirical and careless use of the instrument. Of late years wiser views have prevailed, and the operation is now but seldom practised. Hey's saw, an instrument with a shaft and handle like a common steel fork, and having a plate of steel 1½ inches in breadth and perhaps 1¾ in length attached to it, one edge of which is a straight and the other a convex saw, has almost entirely superseded it for most of those injuries of the skull which were formerly thought to require its use, greatly to the advantage of the patient. By this instrument the depressed portion is itself removed, instead of that which was not fractured, and the injuries to the skull can be remedied with far less loss of bony structure than under the old system.

TRESCHOW, Niels, a Norwegian philosopher, born in Drammen, Sept 5, 1751, died near Christiania, Sept. 22, 1833. He was the son of a merchant, and studied in the university of Copenhagen. After being a teacher in various schools, in 1803 he was appointed professor of philosophy in the university, and in 1813 in that newly founded at Christiania. In 1814 he was elected deputy to the storthing, where he advocated the union of Sweden and Norway under one dynasty, and after the union was appointed a state councillor and head of the department of public instruction and church affairs. He wrote "Morals for the People and the State;" "Principles of Legislation;" "Spirit of Christianity;" and "Philosophical Testament, or Three Books of God, and of the World of Ideas and of Feelings, and of the Revelation of the former in the latter" (2 vols., Christiania, 1831-'2). He also translated the Gospel of St. John.

TRESPASS (Norman Fr. *trèspasser*, from *très*, beyond, and *passer*, to go), in law, as usually defined, a wrongful act, committed with some kind of violence, and injurious to the person, property, or rights of another. Its literal meaning is precisely the same as transgression; it is a step beyond the limits of law or right. In the old law Latin the word *transgressio* was used where trespass is used in English. Formerly the two words were employed in writing and conversation with the same meaning, but now trespass is commonly used only in the legal sense, and is an important law term. A familiar example of trespass may be found in an assault and battery, or a forcible entry into a house or upon lands, breaking open a door, or tearing down a fence. Such an act would be in law a trespass *vi et armis*, or, in the English phrase now used in indictments and declarations, a trespass with force and arms. Early in the history of the law a very slight degree of violence was sufficient to constitute this offence; and soon afterward the law held that it might be committed in some cases without any actual force whatever, implying by construction the force necessary to make it a trespass *vi et armis*, if the act were unlawful. Thus, for example, a peaceable entry into a house or land, with intent to take possession and oust the true owner, was regarded as a trespass *vi et armis*. Soon after there grew up a large and very important class of trespasses, where there was neither actual nor constructive force. The courts in fact invented a form of action, by means of which remedies might be given for a great number of injuries, to which the law of trespass with force and arms could not be made applicable by any construction. This new legal trespass was called, in the law Latin in use when the action was first employed, *transgressio super casum*, and is now called a trespass on the case. In the days of special pleading it had become a matter of great difficulty to determine whether the action by which redress was sought for in certain injuries should be trespass or trespass on the case; for if the plaintiff mistook his form of action, he wholly failed. In some of our states statutes were passed to meet the difficulty. At present, these statutes, with the rules of court and the amended practice, have taken away, if not the theoretical difficulty, at least its practical importance; for in most, if not in all of the states, at this time, if a mistake be made it may be corrected without delay and without cost.

Trespass with force and arms (or trespass alone, for the latter clause is often omitted) lies when the injury complained of is itself the wrong done by the defendant; while trespass on the case lies when the injury was consequential upon the wrong done, and flowed from it indirectly. For example, trespass on the case lies for an injury sustained by the plaintiff from the defendant's sale to him of unwholesome food, as meat or wine, especially where it was the business of the defendant to sell these things. So for an injury caused by the want of skill of any person in the exercise of his profession, as a physician or lawyer. There is yet another nice and very important distinction in the law of trespass. It is certain that a man may begin by doing a right thing in a right way, and then so change his course as to do a wrong thing, or a right thing in a wrong way. In many of these cases such a person thus subsequently trespassing is regarded by the law as a trespasser *ab initio*, or as having been a trespasser through the whole of his conduct. Thus, if, in the execution of a legal process, he does something which is distinctly illegal, the law considers that he began to act with intent to do an illegal thing, and that all of his conduct was tainted by this intention and was therefore illegal. Many cases have turned and much argument has been expended upon this distinction. We can only say that we consider that no man can be made a trespasser *ab initio* by a subsequent wrongful act, unless he did the wrong while in the exercise of a strictly legal right, which the injured party had no right to resist. Hence it seems to be confined by the best authorities to the cases of an officer of the law acting under a legal warrant, and a guest at an inn. It is extended to the latter, on the ground that a licensed innholder, being bound by law to receive a guest, and being subject to indictment if, without sufficient cause, he refuses to receive one, is then protected by the rule, that if the guest, thus exercising his positive right of entry peaceably and without offence, while in the house does a wrong to the innkeeper, the offender shall be held to have entered the house for that purpose, and therefore to be a trespasser from his entrance.

TREVES (Ger. *Trier;* anc. *Augusta Trevirorum*), a town of Prussia, and the capital of an administrative district of the same name, in the province of Rhenish Prussia, situated on the right bank of the Moselle, 57 m. S. W. from Coblentz; pop. about 18,000, nearly all Roman Catholics. The river is crossed by a stone bridge of 8 arches, 690 feet long. The town stands in a fertile valley, surrounded by low vine-clad hills, and consists of the city proper and several suburbs. The former is about 1½ m. long, of oblong shape, surrounded by walls and entered by 8 gates. The cathedral is a very ancient building, and is supposed to have been originally erected by the empress Helena, who is said to have deposited there the seamless garment of the Saviour, now known as the "holy coat of Treves." The exhibition of this garment in 1844 attracted 1,100,000 pilgrims, and brought large sums to the cathedral. The *Liebfrauenkirche*, or church of our dear Lady, built between 1227 and 1248, is a fine specimen of the pure pointed Gothic style. The church of St. Simeon, the most important Roman monument in Germany, was built as the gate of the city, between 314 and 332, and called Porta Nigra; and in the 11th century it was consecrated as a church. The ancient electoral palace, now occupied as a barrack, stands partly upon the site of a Roman edifice, a portion of which still remains with walls 90 feet high and 10 feet thick; it is supposed to have been the residence of Constantine the Great. The university, now called a gymnasium, was founded in 1454; it has a library containing 70,000 volumes and 2,000 manuscripts, among the latter of which is a *Codex Aureus* of the four Gospels. Treves is the seat of a Roman Catholic bishop. The manufactures consist of linen and woollen goods, leather, porcelain, &c. A considerable trade is carried on in all these articles, together with fruit and wine, which is greatly facilitated by the Moselle.—Treves is remarkably rich in Roman antiquities; among which, beside those above mentioned, are the bridge which crosses the river, the remains of the baths, and the amphitheatre. It was the favorite residence of several of the Roman emperors, and is described by the poet Ausonius as the second metropolis of the empire. It was almost totally destroyed during the invasions of the Goths, Vandals, and Huns, but afterward recovered; and in the times of the German empire, being the seat of archbishop-electors, who maintained large armies and possessed extensive territories and political power, it rose to great wealth and splendor. It was captured by the duke of Marlborough in 1704. During the wars consequent on the French revolution it suffered severely, and had its churches and convents plundered and converted into barracks, stables, and warehouses. Together with its electoral territories it was in 1799 annexed to France, the secularization of the archiepiscopal domains being soon after confirmed by the treaty of Lunéville. After the fall of Napoleon almost the whole former electorate, with its capital, was given to Prussia by the congress of Vienna.

TREVIRANUS, Gottfried Reinhold, a German naturalist, born in Bremen, Feb. 4, 1776, died there, Feb. 16, 1837. He was educated at the gymnasium of his native place, and at the university of Göttingen, took his medical degree in 1796, settled as physician in Bremen, and in 1797 became professor of mathematics in the lyceum of that city. His best works are: *Physiologische Fragmente* (2 vols., Hanover, 1797-'9); *Biologie oder Philosophie der lebenden Natur* (6 vols., Göttingen, 1802-'22); and *Erscheinungen und Gesetze des organischen Lebens* (2 vols., Bremen, 1831-'2).—Ludolf Christian, a German botanist, brother of the preceding, born in Bremen, Sept. 10, 1779.

He early began the study of the natural sciences, became in 1807 professor of medicine in the lyceum at Berlin, in 1812 ordinary professor of botany and natural history at Rostock, in 1816 professor of botany and director of the botanic garden at Breslau, and subsequently was transferred to Bonn, where he now holds the last named position. His principal work is his *Physiologie der Gewächse* (2 vols., Bonn, 1835–'9). He has also written *Vom inwendigen Bau der Gewächse* (Göttingen, 1806), and in 1855 published a treatise at Leipsic on the application of wood engraving to the delineation of plants. He also assisted his brother in his *Vermischte Schriften anatomischen und physiologischen Inhalts* (4 vols., Göttingen and Bremen, 1816–21), and from 1824 to 1835 edited, with his brother and Tiedemann, the *Zeitschrift für Physiologie*.

TREVISO (anc. *Tarvisium*), a fortified city of Austrian Italy, and the capital of a delegation of the same name in the government of Venice, situated on the river Sile, 20 m. N. N. W. from Venice; pop. about 20,000. The Sile is navigable for boats, and communicates by means of canals with the lagoons of Venice. Silk and cotton goods and cutlery are manufactured. A considerable trade is carried on in grain, fruit, and cattle; and an annual fair is held in October, which lasts 15 days. Treviso is the see of a bishop, and has several societies for advancing knowledge. It was a town of importance under the Romans, was made by the Lombards the capital of their two margraviates, became independent during the feuds between the Guelphs and Ghibellines, and in 1344 placed itself under the government of Venice, and has since that time shared her fate. In 1797 it was taken by the French under Mortier, who in 1808 received the title of duke of Treviso. In the summer of 1848 it was for a short time defended against the Austrians.

TRIADITZA. See Sophia.

TRIAL. See Jury, and Process.

TRIANGLE. See Trigonometry.

TRIANGULATION. See Surveying.

TRIBE (Lat. *tribus*), the term applied to the principal divisions of the Roman people. The Romans are said to have been divided by Romulus into 3 tribes, the Ramnenses, the Titienses, and the Luceres, respectively, it is believed, representing the Latin, the Sabine, and the Etruscan elements of the population, or rather of the patricians, who in the earliest period of Roman history constituted the state. Each tribe was subdivided into 10 *curiæ*, and was bound to furnish 1,000 men to serve on foot, and 100 horsemen, or *celeres*, out of whom subsequently the order of *equites* or knights was formed. This arrangement was altered by the constitution ascribed to Servius Tullius, which admitted the plebeians to a share in political power, and divided the city into 4 and the surrounding country into 26 circles. About the middle of the 3d century B. C. the number of tribes had been augmented to 35 by successive additions, but no others were made afterward. Though the number of tribes thus varied, that of the curiæ always remained the same, the relation of the latter to the former being modified.—In the Grecian states of antiquity, also, the people are frequently mentioned as divided into tribes (φυλα or φυλαι), which at an early period had the character of clans, and later mostly that of territorial or political divisions. There, where the people were of different races, not sufficiently blended together, the tribes frequently constituted classes distinguished by a difference of rights. They were subdivided into φρατριαι (fraternities), γενη (*gentes*), &c. The Dorians were originally divided into 3 clans called Hylleis, Pamphyli, and Dymanatæ, and traces of this division can be discovered in the history of almost all the countries settled by them. The Ionians in Attica and elsewhere were divided into Teleontes or Geleontes, Hopletes, Argadenses, and Ægicorenses. Theseus introduced a political division of the people into Eupatridæ (nobles), Geomori (agriculturists), and Demiurgi (laborers). The constitution of Solon preserved the original division into 4 clans, though considerably lessening its importance; that of Clisthenes abolished it, creating 10 new tribes of a territorial character, subdivided into 100 *demi*. (See Demos.)—For the tribes of Israel, see Hebrews, vol. ix. p. 80.

TRIBONIANUS, a Roman jurist and publicist, who flourished during the reign of Justinian, died A. D. 545. Under Justinian he occupied the offices of *quæstor sacri palatii*, of *magister officiorum*, of prætorian prefect, and of consul. According to doubtful statements of Suidas, he is described as a man of great natural abilities and of wonderful learning, but avaricious, corrupt, and with great skill in flattery. In 528 he was one of the 10 commissioners selected by the emperor to form his first Codex, and in 530 was placed at the head of the committee of the most celebrated jurists of that time who were to compile the Digest or Pandects, which was finished and promulgated in 533. He at the same time, with two others, compiled the 4 books of the Institutes of Justinian, published in 533; and the second Codex of that emperor, published in 534, was also his work.

TRIBUNE (Lat. *tribunus*), literally, a Roman officer who presided over a tribe for certain purposes connected with its internal administration, or represented it in some other capacity. It is proper to remark, however, that some of the various officers to whom the name was applied exercised functions not included in this signification. Six kinds of tribunes are mentioned in Roman history, viz.: tribunes of the three ancient tribes, *tribuni celerum*, tribunes of the Servian tribes, tribunes of the people, military tribunes with consular power, and tribunes of the soldiers, whose offices were created nearly in the order here given.—The existence of a tribune or head of each of the three patrician tribes, the

Ramnenses, the Titienses, and the Luceres, which originally comprehended the whole body of Roman citizens, is better established than the nature of the functions exercised by such officers, which, it may be said in general terms, included the direction of all civil, religious, and military affairs. They do not occur after the three tribes ceased to exist as political bodies.—The *tribunus celerum*, under the kings, was the commander of the 300 *celeres* or royal body guard, of whom 100 were taken from each tribe; and in the absence of the king, to whom he was next in rank, he convoked the senate and performed other royal functions. The office ceased with the overthrow of the kingly rule.—The tribunes of the Servian tribes were the administrative chiefs of the 30 local tribes into which Servius Tullius divided the Roman commonalty, and were originally charged with keeping a register of the inhabitants of their respective districts, and of their property, for the purpose of taxation. They are supposed by Niebuhr to be identical with the *tribuni ærarii*, who in the later days of the republic acted as general inspectors and collectors of the *æs militare* for the payment of the troops.—The tribunes of the people (*tribuni plebis*) were the most important of all the officers bearing the name; and to the influence which they exerted in checking the usurpations of the aristocratical element have been attributed the greatness of Rome and its long duration. They were first created after the secession of the commonalty to the Mons Sacer, in 494 B. C., as one of the conditions of its return to the city, and were empowered to afford protection to the plebeians against any abuse on the part of the patrician magistrates, for which purpose their persons were declared sacred and inviolable, and any attempt against their inviolability was made punishable by outlawry and forfeiture of property. They appear to have been originally two in number, and to have been elected for the term of one year by the comitia of the centuries; but as the latter were under the control of the patricians and their clients, the real advantage gained by the plebeians was for some time scarcely more than nominal, and it became evident that, in order to make the tribunes really the representatives and protectors of their order, they must be chosen by that order. It was not until several serious collisions had taken place between patricians and plebeians, owing to the systematic violation by the former of the prerogatives of the tribunitian office, that in 471 B. C. a law proposed by the tribune Volero Publilius, and hence called the Publilian law, was passed, by which the election of the tribunes was given to the comitia of the tribes. About the same time, or perhaps somewhat earlier, the number was increased to 5, and from the fall of the 2d decemvirate in 449 B. C. until the end of the empire 10 tribunes were annually elected. The tribunes being essentially the representatives and organs of the plebeian order, none but members of that order were eligible for the office; so that if a patrician were desirous of filling it, he was obliged to qualify himself by becoming a plebeian. The early incumbents of the office exercised authority within the city limits and over one mile of adjacent territory; and in order that access might be had to them at all times, the doors of their houses were ordered to be open day and night, and all persons taking refuge there were assured of protection. For similar reasons they were forbidden to absent themselves from the city for a whole day. Although their lawful power was originally merely *auxilium*, or the right to afford protection, they assumed within a few years the right to convoke the senate, and in 454 succeeded, after a long struggle, in securing the appointment of the three commissioners whose labors led to codification of the laws of the 12 tables. During the 2d decemvirate the tribunate was suspended, but with the overthrow of that oligarchy it was restored with augmented powers; and as the tribes now included patricians and their clients as well as plebeians, the tribunes became the protectors of all classes of citizens. They now also acquired the right to be present at the deliberations of the senate, and to take part in its discussions, although not allowed to pass within the doors of the senate house; and hence they gradually assumed the privilege of intercession against any action taken by a magistrate, and by the interposition of their veto were enabled to annul any decree of the senate or stop any law, without cause or reason assigned. On the other hand, they sometimes interfered to compel the consuls to comply with decrees of the senate. In 130 B. C. they became senators by virtue of their office. They also added to their right of bringing patricians who had violated the rights of plebeians before the comitia of the tribes, that of commanding their *viatores* or attendants to seize a refractory magistrate, as a consul or a censor, and imprison him, or even to hurl him from the Tarpeian rock. Of equal importance was the power exclusively possessed by them, and frequently exercised without consulting the senate, of proposing *plebiscita* to the comitia of the tribes; and after these had obtained by the Hortensian law, 286 B. C., the binding force of laws, the tribunes became, as Niebuhr has observed, a magistracy for the whole Roman people in opposition to the senate and the oligarchical elements in general, although they had nothing to do with the administration of the government. One element of weakness, however, occasionally impaired the tribunitian power, which for upward of a century after the creation of the office had been exercised in accordance with the will of a majority of the college of tribunes. Subsequent to 394 B. C. the veto of a single tribune sufficed to render a resolution of his colleagues void; and it was not until Tiberius Gracchus introduced the practice of appealing to the people to remove a tribune who obstinately adhered to his veto, that the harmonious working of the system was restored. During the latter period of the republic the tribunes wielded such enormous powers that Sylla in his reform of the constitution on an aristocratic basis gave them merely the *jus auxiliandi* which they originally possessed. Pompey restored them to their former power, but under the empire their privileges became much restricted, although until the 5th century of the Christian era they continued to have the right of intercession against decrees of the senate and on behalf of oppressed individuals. The emperors, though patricians, found it necessary to be tribunes, and the *tribunicia potestas*, conferred by the senate upon Augustus and his successors, was considered an essential part of the imperial dignity.—The office of military tribune with consular power originated in a compromise between the patricians and the plebeians, during the agitation of the project of C. Canuleius to open the consulship to both orders. The patricians consented that the consulship should be suspended, and that tribunes of the soldiers having consular powers should be elected in their stead indiscriminately from patricians or plebeians. In 444 B. C. three officers having this title were elected, and thenceforth until 366 the people were allowed to elect tribunes or consuls at their option. They varied from 3 to 6 in number, and had all the powers of consuls except that of censor, which was given to a new class of public officers.—Tribunes of soldiers were a class of military officers, of whom from 4 to 6 were attached to a legion. Originally they commanded the legion by turns, each holding office for two months, but subsequently they performed staff and administrative duties. Half of them were elected by the people, and half appointed by the consuls.

TRICHINOPOLY, a town of British India, capital of a district of the same name in the presidency of Madras, situated on the right bank of the river Cavery, in lat. 10° 50′ N., long. 78° 44′ E., 75 m. N. E. from Madura, and 190 m. S. S. W. from Madras; pop. 35,000. The fort of Trichinopoly is about a mile long and half a mile wide, built on the declivity of a granite peak about 600 feet high. On the top of the rock there are a citadel, a large pagoda, and some other Hindoo buildings. The walls of the fort are from 20 to 30 feet high and of great strength, and enclose a native town in which there are government stores, an arsenal, hospital, gaol, missionary chapel, &c. Outside the walls there are extensive barracks, hospitals, public rooms, a church and Roman Catholic chapel, and the tomb of Bishop Heber, who died here. The surrounding country is wonderfully fertile and populous; and the island of Seringham, which is here formed by the Cavery, is famous for the size and wealth of the Hindoo pagodas which it contains. Trichinopoly is the head-quarters of the southern division of the Madras army, and the garrison generally consists of about 5,000 men, 1,200 of whom are British infantry and artillery. Cotton cloths, hardware, harness, cheroots, indigo, and jewelry are manufactured and exported to different parts of India and the Mauritius. Good roads connect Trichinopoly with Madras and all the surrounding districts.—Trichinopoly, after the death of its last rajah in 1732, fell into the power of the nabob of Arcot, and subsequently changed hands several times, figuring conspicuously in the contests of the French and English for supremacy in India. It finally came under English government with the rest of the Carnatic in 1801.

TRICOLOR, the name usually applied to the national banner of France, which consists of 3 colors, blue, white, and red, running in a direction parallel to the flag staff. It was adopted at the period of the first revolution, and owes its peculiar combination of colors, according to some authorities, to accident; although the liveries of Philippe Égalité, duke of Orleans, which were blue, white, and red, are also supposed to have suggested it. These colors, however, had been for many years previous used in combination as a national emblem, and were conferred upon the Dutch at their request by Henry IV., although in the flag of Holland they run in a direction at a right angle with the staff. They were successively employed in the French standards at different periods, viz.: the blue banner of St. Martin, the red or crimson of the oriflamme, and the white of the white cross, which was also the family color of the Bourbons. Since the French revolution tricolors, formed by the combination of any 3 colors, have been the favorite emblems of those engaged in liberal or revolutionary movements; and various European governments have arranged their national standards on a similar principle, as Belgium, Italy, &c. The national colors of Germany are those of the ancient empire, black, red, and gold.

TRIESTE (Ger. *Triest;* anc. *Tergeste*), the principal seaport of the Austrian empire, formerly capital of a governmental circle of the same name, and now of the crown land of Goritz, Gradisca, Istria, and Trieste, at the head of the gulf of Trieste in the N. E. of the Adriatic, 73 m. E. N. E. from Venice and 343 m. S. W. from Vienna (with both which cities it is connected by railway), in lat. 45° 38′ 50″ N. and long. 13° 48′ E.; pop. in 1862, with its suburbs, 104,718. It is situated partly on level ground, and partly on the slopes of a hill whose summit is crowned by a citadel. It is divided into the old and new towns; the former occupies the southern and elevated portion, and has steep, zigzag, narrow, and dirty streets and blank walls. There are also numerous lofty, winding, labyrinthine flights of stone steps, with houses on both sides. Still it contains many broad streets and stately houses. The new town is separated from the old by a broad *corso* or avenue, and has wide straight streets, fine buildings, and numerous public squares with fountains. The environs are very picturesque, the hillsides being built up in terraces and sprinkled with villas. The limestone hills behind the town contain numerous caverns hung with stalactites, which, before the railroad had made Adelsberg so accessible, were much visited. A wall surrounds the city. The Maria Theresa canal, large enough to admit vessels of ordinary size, penetrates into the heart of the new city. The most remarkable buildings are the cathedral of San Giusto, founded in the 5th century, in the Byzantine style, but injured by alterations made in the 14th century, the tower of which is said to stand on the foundation of a temple of Jupiter, which, with its crumbling Corinthian columns bound together by iron hoops, may be seen through arches cut in the tower; the church of St. Anthony, erected in 1830 at the head of the Maria Theresa canal; the Tergesteum, a splendid modern edifice comprising a bazaar, a fine concert and ball room, the exchange, the rooms of the Austrian Lloyd's, and the Casino Tedesco; the old exchange in the Piazza della Borsa, on which is a fountain and statue of the emperor Leopold I.; an opera house, and 3 theatres. Musical entertainments of a superior kind are given almost every evening; the annual musical festival in September is one of the finest in Europe. Beside the churches already mentioned, there are many others, including two Greek churches (one of the oriental, the other of the Serbo-Illyrian rite), an Anglican church dependent on the bishop of Malta, an Evangelical Lutheran church, and one of the Helvetic confession. This last occupies a small building which is said to stand on the foundation of the house of the martyrs Eugenia and Thecla, and to have been used as the first Christian church. The new lazaretto is one of the largest and best arranged in Europe. The railroad depot buildings are on a magnificent scale, the grounds covering 40 acres. This station, and those of Grignano and Nabrisina (where the road diverges, one branch to Venice and the other to Vienna), are supplied with water from the Timarus of the Romans, which, after a subterranean course, bursts from under the mountain into the gulf. The water is pumped up by steam to the height of 580 feet, and carried in iron pipes to its destination. There are also a custom house, post office, hospital, a large new poorhouse, barracks, governor's palace, and numerous schools. The public library of 30,000 volumes contains, among other things, a complete collection of all the printed editions of Petrarch, with all the books in all languages relating to him, and several fine manuscripts, one or two written by his own hand. In the same building, which contains also the imperial naval school, is a museum of natural history. There are also a botanic garden, a public garden, and a fine grove of oaks on the steep declivity of a hill laid out in gravel walks and open to the public. The archduke Maximilian's beautiful villa of Mira Mare with its fine grounds is open to visitors, and a road 5 m. in length along the shore of the gulf has been constructed for that purpose. The grounds of several other villas not far from the city are also open to visitors. Several merchants and bankers have fine collections of paintings and statuary. Near the cathedral is an enclosure containing a large collection of Roman monuments, to which additions are constantly made. In this enclosure is the tomb of Winckelmann, who perished at Trieste by the hand of an assassin. There are 6 newspapers published, of which 4 are in Italian, one in German, and one in Greek.—The harbor is small, but very good, being protected on all sides except the N. W. It is deep enough for vessels of 300 tons to come up to the quays, and for those of any draught except the very largest to ride at anchor. It is in crescent form, and the S. W. horn is formed by the Theresa mole, which terminates in a fort and lighthouse, and encloses a large quarantine anchorage ground. There are extensive shipbuilding docks near the harbor. The trade has steadily increased since it was made a free port by the empress Maria Theresa, in the middle of the last century, and is now very large. Its principal exports are grain, rice, wine and liqueurs, oil, flax, hemp, tobacco, silk, wool, wax, marble, iron, lead, quicksilver, copper, alum, vitriol, silk stuffs, glass, leather, soap, printed cottons, and coarse and fine linens. The imports comprise cotton, silk, dye-stuffs, hides, raisins, Odessa wheat, rice, oil, and fruits and produce from the West Indies, Brazil, and the United States. The value of the imports in 1850 was $17,485,728; in 1855 it had fallen to $12,406,024, but in 1859 had increased to $66,342,773, and in 1860 to $72,102,440, of which amount $2,693,298 was from the United States. The exports in 1859 amounted to $56,491,949, and those of 1860 to $60,562,547, including $583,275 to the United States. The arrivals in 1860 were 10,248 vessels, tonnage 717,296, of which 963 were steamers, tonnage 252,212; the departures were 10,322, tonnage 786,078, of which 959 were steamers, tonnage 251,780. Of these more than ⅘ were under the Austrian flag. The Austrian Lloyd's steam packet company, formed in 1833, has 40 or 50 steamers plying between Trieste and the principal ports of the Adriatic, the Levant, and the Black sea. Trieste, though notable mainly for its commerce, has considerable manufactures. Beside the ship building already noticed, there are manufactories of earthenware, leather, wines, spirits, soap, playing cards, and musical instruments, sugar refineries, tanneries, and dye houses. The people are of various races, Italians, Slavi, Greeks, Germans, Jews, &c. There are many foreign commercial houses in the city. The climate is variable, and subject to sudden changes owing to the alternate prevalence of the hot and oppressive sirocco and the cold and cutting *bora;* but in the winter and spring it is oftenest calm.—Tergeste was a city prior to the Roman conquest, which took place in 179 B. C. Augustus fortified and surrounded it with walls. It escaped the invasion of Attila by which Aquileia was destroyed, and passed under the dominion of the Ostrogoths, and afterward of the Greek emperors, till the period of the Lombard invasion. Subsequently Trieste became independent under its bishop, who bore the title of count, and who gradually sold to the inhabitants the privileges of a free city. Long wars ensued with the patriarchs of Aquileia, who as margraves of Istria claimed the allegiance of the bishops of Trieste, and in these wars Venice and Genoa also took part. The peace of Turin in 1381 acknowledged Trieste as an independent city, and the next year the citizens voluntarily submitted to the house of Austria. Charles VI. declared it a free city in 1719, and Maria Theresa made it a free port in 1750. It was taken by the French in 1797 and again in 1805. From 1809 to 1814 it belonged to the French province of Illyria, and subsequently, till 1850, to the Austrian kingdom of that name.

TRIGG, a S. W. co. of Ky., bordering on Tenn., bounded W. by the Tennessee river and drained by the Cumberland and Little rivers; area, 530 sq. m.; pop. in 1860, 11,052, of whom 3,449 were slaves. The surface is hilly and the soil fertile in parts. The productions in 1850 were 604,515 bushels of Indian corn, 87,090 of oats, and 1,653,485 lbs. of tobacco. There were 18 churches, and 631 pupils attending public schools. Horses, cattle, mules, and swine are raised and exported in great numbers. Iron, bituminous coal, and limestone are found. Capital, Cadiz.

TRIGONOMETRY, that branch of mathematics which undertakes to compute the unknown elements of triangles when certain other elements are given. It is called plane when it considers triangles which lie wholly in a plane surface, and spherical when it considers triangles formed in the surface of a sphere by the intersection of 3 great circles, that is, circles whose plane passes through the centre of the sphere. Of the 6 elements (3 sides and 3 angles), 3 must always be given for the determination of the rest. The angles are not employed as in geometry, but in their stead certain functions of them called the sine, cosine, tangent, cotangent, &c. These functions have been calculated for all acute angles and arranged in logarithmic tables. To explain them briefly: consider a plane right-angled triangle, *abc*, in which *ac* represents the hypothenuse; $\frac{bc}{ac}$ will express the sine of the angle at *a*, and likewise the cosine of the angle at *c*; $\frac{bc}{ab}$ will express the tangent of the angle at *a*, and likewise the cotangent of the angle at *c*. If the hypothenuse be taken as unity, *bc* will express the sine and *ab* the cosine of the angle at *a*; from which it appears that the sine of an acute angle will increase, and its cosine diminish, as the angle increases; at 90° the sine reaches its maximum or unity, and the cosine its minimum or zero. For acute-angled plane triangles the following propositions are of leading importance: 1, any two sides of a triangle have to each other the same ratio as the sines of their opposite angles; 2, the sum of the two sides of a triangle is to their difference, as the tangent of half the sum of the angles lying opposite them is to the tangent of half their difference.—For the application of trigonometry to surveying see Coast Survey, and Surveying.

TRILL, or Shake, in music, an embellishment consisting of the alternate reiteration of two adjoining notes, the lower of which, being the chief or essential tone, is marked with the character *tr*. It comprehends an interval not greater than a whole tone nor less than a semitone, and is generally commenced with the upper or assistant note, ending with the lower. Both notes should be distinctly heard, and the interval carefully preserved.

TRILLIUM (Lat. *trilix*, triple), a genus of North American herbaceous perennial plants, of the natural order *smilaceæ*, and much admired either when wild or under cultivation. About 12 species are enumerated as occurring in the United States, all having a general resemblance. The stem is simple, arising singly from a short tuber-like rootstock, which is stout, from 3 to 8 inches high, bearing on its summit 3 broadly ovate leaves and a terminal flower consisting of 3 lanceolate, persistent, spreading sepals, 3 larger petals which wither as the flower advances, 6 stamens with linear anthers, the styles consisting of 3 awl-shaped processes spreading above and persistent, the inner surfaces being stigmatic, succeeded by an ovate, angular, 3-celled, purple or crimson berry, containing several seeds affixed horizontally in each cell. The finest for the flower border is the large white trillium (*T. grandiflorum*, Salisbury), having large dark green foliage and very conspicuous white petals, changing to rosy pink just before they wither. It is found in forests from Vermont to Wisconsin and northward, and increases rapidly under cultivation both from its seeds and multiplication of its roots. A smaller species, appearing in April with its pretty white flowers, is the dwarf trillium (*T. nivale*, Riddell), found in Ohio and Wisconsin. The painted trillium (*T. erythrocarpum*, Mx.) has oval, pointed, wavy white petals, which are striped with purple lines at their base. It grows in cold damp woods from New England northward, and in portions of the Alleghanies of Virginia. The birthroot (*T. erectum*, Linn.) is a conspicuous plant, with broad, rhomboidal, and abruptly pointed leaves, and ovate, spreading, dark purple petals, which sometimes are greenish white or yellowish, when it becomes the variety *album* of Pursh. They grow together in rich woods of New England and New York, northward and westward. The root affords a violent emetic. Another species is the *T. sessile* (Linn.), with its leaves and flowers sessile, the petals dull purple varying to greenish, found from Pennsylvania to Wisconsin and southward. Its root has similar medicinal properties. Two or three species are particularly southern, and have rose-colored petals. The drooping trillium (*T. cernuum*, Linn.) has clustered stems, 2 or 3 together, broadly rhomboidal leaves, and small, acute, wavy, recurved, short, white-petalled flowers, concealed by the curved peduncle beneath the leaves. Its distribution is very wide from New England southwardly. —A blue coloring matter can be procured by treating the juice of the ripe berries of the trillium with alum, and the general medicinal properties of the species are emetic.

TRILOBITE (Gr. *τρεις*, three, and *λοβος*, lobe), the name of a group of fossil crustaceans, so called from the 3 lobes into which the body is divided; they form the *palæadæ* of Dalmann and the *branchio-podaires* of Milne-Edwards. They were once supposed to be mollusks with 3-lobed shells and a fleshy gasteropodous foot, but are now known to be articulates; they do not correspond exactly to any living group, but, according to Burmeister ("Organization of Trilobites," Ray society's publications, 4to., London, 1846), were a peculiar family of crustaceans, nearly allied to the existing *phyllopoda* (like *apus* and *branchipus*), and forming a connecting link between these and the *pæcilopoda* (like *argulus*, *caligus*, and other parasites called fish lice); they come nearest to phyllopods, especially in the double large eyes, undeveloped antennæ, and soft membranous feet, and nearest of all to *branchipus;* a marked resemblance in the form of the *limulus* (king-crab, or common horseshoe of our coasts) is also observed to that of many species of trilobites. The general form of the animal is oval, divided into 3 well defined regions, the head or buckler, the thorax, and the abdomen or *pygidium*, the last 2 composed of semicircular plates or segments, varying in number, by whose movements the animal could roll itself into a ball like the common wood louse and pill bug (*oniscus* and *armadillo*). Each of these 3 divisions presents 3 lobes limited by 2 longitudinal· depressions; the head is generally the largest and considerably the widest, varying from ¼ to ⅓ the total length, semicircular, with a border often ornamented with granulations, depressions, and spines; the middle portion is the *glabella*, the grooves which mark its lateral limit corresponding, according to Barrande (*Système silurien de Bohême*, 4to., Paris, 1853), to the insertion of the jaws or first pair of feet; the different pieces are united by distinct sutures, which are important zoological characters. Eyes were denied to some genera, *conocephalites* being the only one in the primordial fauna in which these organs are certainly known to have been present; some had eyes when young, but lost them when old; others had 2 well formed, compound, facetted, prominent eyes, which are often perfectly preserved in the fossil state; they are sometimes larger than half the length of the head, the greatest diameter being almost always the longitudinal; they had no simple eyes. Traces of a mouth have been distinguished in a few; no traces of antennæ have been found, and they were probably short and feebly developed. The number of the thoracic segments varies in different genera, and at different stages of growth, but is constant in adults of the same species; the terminal portions on the sides are the *pleuræ*, and are curved backward and sometimes very long; no traces of feet have been discovered, but they were doubtless soft, membranous, and leaf-shaped, as in *phyllopoda*. The *pygidium* was made up of segments like those of the thorax, but consolidated to form a posterior buckler; it was usually semicircular, less long than wide, developed inversely to the thorax, and the largest in the more recent genera. The shell had a thinner horny membrane covering it, becoming more delicate toward the median line; between the two is found in the fossils a stony layer measuring their distance from each other; the lower surface was soft and membranous; the skin was undoubtedly cast as in other articulates, and Wahlenberg has suggested that some supposed new species may have been founded on their cast shells. They have been divided into 3 families, according to the nature of their covering: 1, *eurypteridæ*, without shell, including the single genus *eurypterus* (De Kay); 2, *cytherinidæ*, with bivalve, bean-shaped shell, including the single genus *cytherina* (Lam.); and 3, *trilobitæ*, with a shell having as many rings as there are joints to the body, containing many genera and species, and divided into 2 large groups, one with the power of rolling into a ball, like *ogygia* (Brongn.), and the other with no such power, as in *calymene* (Brongn.); the first are found chiefly in limestone strata, and are less ancient than the second, which occur principally in the lowest silurian rocks. According to Burmeister, the trilobites moved only by swimming, just below the surface of the water, with the back downward, rolling into a ball when danger threatened from above, and did not creep upon the bottom; they lived in shallow water, near the coast, associating in immense numbers, chiefly of the same species; while only 6 or 8 species occur in a given stratum, the number of individuals was very great; their food consisted of small aquatic animals and their spawn; they underwent progressive metamorphoses, and varied considerably according to age; their metamorphoses are given at length by Barrande, who makes 4 distinct types, according to the serial development of the different parts.—Trilobites are the oldest of the articulata, and among the first created animals on this planet; though none are now living, during the palæozoic period they were very abundant, and almost the only representatives of their class.

They have been most studied in Bohemia, and by M. Barrande. There are none found above the carboniferous rocks, and only one genus (*Phillipsia*), according to Pictet, in that; Barrande's primordial fauna, or the lower silurian, has one genus but no species passing to his second fauna or middle silurian, and this has many genera but no species common to it and the third fauna or upper silurian, which in turn has several genera passing to the devonian fauna—the whole series affording remarkable proofs of the limitations of faunæ in time; their distribution in space was also very circumscribed, probably on account of their feeble locomotive powers. In America several trilobites, especially *paradoxides* and its allied genera, have been met with in slates formerly classed among the metamorphic rocks, as the *P. Harlani* (Green), found in Braintree, Mass., in 1856, by Prof. W. B. Rogers, and this and other trilobites in Canada and Newfoundland.—The trilobites have long attracted much interest, as well on account of the great numbers in which they have been found in many localities, as from their singular conformation, and the perfect state in which their forms are preserved. They were noticed in the "Philosophical Transactions" for Aug. 1698, and Burmeister, in his work referred to above, cites 98 authors whose writings he has examined on this subject. The eye is a feature of great beauty in this animal, and its perfection in many of the stony fossils, especially some brought from the Hartz mountains, and from the upper silurian limestone of Dudley, England, is very remarkable; the facets or lenses, sometimes nearly 400 in number, are like those observed in the eye of the dragon fly and butterfly, and as in these insects are arranged around a conical-shaped tube through which the visual rays enter from almost every direction; in the *asaphus caudatus* each eye thus has a range of nearly ¾ of a circle, and both together command a panoramic view. Buckland in his "Geology and Mineralogy considered with reference to Natural Theology," vol. i. p. 370 (London, 1858), avails himself of this interesting feature, so perfectly developed in the most ancient periods of organic life, to draw an argument of the identity of mechanical arrangements existing through the long succession of animated beings down to the present time, and hence of the continuance of the same intelligent creative power. The structure of the eye also indicates the prevalence in those ancient periods of the same conditions of the waters and the atmosphere, as regards their adaptation to the organs of vision, as now obtain; and it affords a strong argument against the theory of a gradually advancing development in animal structures in the progress of geological periods.—The geographical range of trilobites is very extensive; these fossils are met with at most distant points, both of the southern and northern hemispheres; they are found all over northern Europe, and in numerous localities in North America, in the Andes of Bolivia, and at the Cape of Good Hope. Trenton Falls, N. Y., has afforded, in the limestone known by its name, fine specimens of the species *calymene Blumenbachii* (Brongn.). Lebanon, Ohio, is another interesting locality. In Adams co., Ohio, Dr. Locke procured an *isoletus*, to which he gave the specific name *megistos*, that measured more than 20 inches in length and 12 in width. The *isoletus gigas* (De Kay) and *paradoxides Harlani* have been found 12 inches long.

TRIMBLE, a N. co. of Kentucky, bordering on the Ohio river; area, 150 sq. m.; pop. in 1860, 5,880, of whom 881 were slaves. The surface is generally hilly and the soil fertile. The productions in 1850 were 286,795 bushels of Indian corn, 19,516 of wheat, 30,754 of oats, and 454,722 lbs. of tobacco. There were 14 churches, and 320 pupils attending public schools. Capital, Bedford.

TRIMMER, Sarah, an English writer of juvenile and educational works, born in Ipswich, Jan. 6, 1741, died Dec. 15, 1810. She was the daughter of Joshua Kirby, author of "The Perspective of Architecture," and subsequently tutor in perspective to George III., then prince of Wales, and at the age of 21 was married to Mr. Trimmer. About 1780 she began her literary career with an "Easy Introduction to the Knowledge of Nature," and from 1782 to 1784 appeared 6 volumes under the title of "Sacred History, selected from the Scriptures, with Annotations and Reflections, adapted to the Comprehension of Young Persons." In 1786 she published the "Economy of Charity," of which a revised and enlarged edition appeared in 1801. She also edited the "Family Magazine," designed for the instruction of the lower classes, and subsequently carried on a periodical work called the "Guardian of Education." She wrote books for the use of charity schools, which received the sanction of the society for the promotion of Christian knowledge. In 1806 she published a "Comparative View of the New Plan of Education," which caused much controversy by the views it took of the education of the poor. An "Account of the Life and Writings of Mrs. Trimmer" was published in 1814 (2 vols. 8vo.).

TRINCOMALEE, a town of Ceylon, situated in the S. E. part of the island, in lat. 8° 33′ N., long. 81° 14′ E.; pop. about 20,000. It stands on the N. side of the entrance to a capacious and secure harbor at the foot of well wooded hills, and two heights crowned by forts, beside which the port is defended by numerous fortifications which extend for about a mile along the shore. The inner harbor is landlocked, and has water in many places sufficient to float the largest vessels close to the shore; but its peculiar superiority over all other harbors of India consists in its being accessible to all descriptions of ships during both monsoons. The inhabitants are mostly Tamulians and their descendants, from the S. E. coast of India. The trade is of little importance, but a considerable quantity of precious stones are found in the neighborhood. The Portuguese were the first European nation that formed a settlement at Trincomalee. They were expelled by the Dutch, who held the place till 1782, when they were in turn driven out by the British; but an insufficient garrison having been left for its defence, it was captured by the French, who restored it to the Dutch. In 1795 the British again captured it after a siege of three weeks, and it has since then remained in their possession and been their chief naval station in the Indian ocean.

TRINIDAD, one of the British West India islands, situated at the mouth of the gulf of Paria, off the N. E. coast of Venezuela, opposite the N. mouth of the Orinoco, between lat. 10° and 11° N. and long. 61° and 62° W.; length N. and S. about 50 m., average breadth 30 m.; area, about 2,400 sq. m.; pop. in 1851, 68,645. Its S. W. and N. W. extremities approach to within 7 and 13 m. respectively of the continent of America. There is excellent anchorage in many places between Trinidad and the mainland, beside which there are several good harbors on the other sides of the island. It is crossed by three ranges of hills from W. to E.; the highest borders the N. coast, and attains an elevation in places of 3,000 feet; the second range is from 600 to 1,000 feet high, and occupies the centre of the island; while the third, of about the same elevation, stretches along the S. coast. There are in some places level and undulating tracts in the valleys between these ranges, but in others the surface is considerably broken. Both valleys are drained by rivers with numerous tributaries. Much of Trinidad is alluvial, and appears to have been formed by the mud deposited by the Orinoco. The mountains consist of clay and mica slate; and quartz, pyrites, arsenic, alum, sulphate of copper, graphite, and sulphur are all found. In a volcanic district on the W. coast there is an asphaltum lake, 150 acres in extent and of unknown depth. At the side next the interior of the island it is cold and firm, and rent into chasms from 3 to 30 feet wide; but toward the sea it is liquid and in a state of slow ebullition. Traces of volcanoes appear in several parts of Trinidad; bitumen is thrown by the sea upon the shore in the neighborhood of the lake, and there is an active mud volcano at the extremity of the S. promontory. At Port of Spain, the capital, the temperature ranges between 74° and 86° in summer, and 70° and 81° in the coldest months. The fall of rain is 65 inches during the year; the island is beyond the range of hurricanes; slight shocks of earthquake are sometimes felt. A great deal of the soil is fertile, and the elevated parts of the island are covered with dense forests. The chief productions are sugar cane, coffee, and cacao; and cotton, indigo, tobacco, nutmegs, cinnamon, cloves, &c., are raised in small quantities. The indigenous animals are two species of small deer, the opossum, armadillo, para, porcupine, ant-bear, sloth, muskrat, tiger cat, two species of lizards, and numerous monkeys. Fish are abundant. The settlements are chiefly upon the N. W. coast and in the adjacent valley. A considerable trade is carried on with the United States in lumber and provisions. The public affairs of Trinidad are administered by a lieutenant-governor, assisted by executive and legislative councils. The island was discovered by Columbus in July, 1498, was taken possession of by the Spaniards in 1588, captured by the French in 1676, but soon restored to the Spaniards, and was finally taken by the British from the latter in 1797.

TRINITY (Lat. *trinitas*), the name which, in the theology of the Roman Catholic, the eastern, and most of the Protestant churches, denotes the nature of the Divine Being, attributing the one divine substance to three persons (Father, Son, and Holy Ghost), so that all the three are one God as to substance, but three persons as to individuality. Those who accept this doctrine are called Trinitarians, those who reject it Anti-Trinitarians or Unitarians. The word Trinity occurs neither in the Old nor New Testament. It is allowed by Trinitarians that no passage of the Old Testament can be adduced which would show that the doctrine of the Trinity was known to the Israelites, but many passages are claimed as proving the belief of the Israelites in a plurality in the Godhead. Each of these texts, however, has been interpreted in a different manner by Trinitarians themselves. From the New Testament two large classes of texts are quoted as arguments for establishing the doctrine of the Trinity: those in which Father, Son, and Holy Spirit are mentioned in connection, and those in which these three subjects are mentioned separately, and in which their nature and mutual relation are more particularly described. The term Trinity (Gr. τριας) was introduced, after the example of Platonic philosophers, by Theophilus of Antioch, in the 2d century, and was afterward often used by Origen in the 3d century. Among the Latin ecclesiastical writers, Tertullian was the first to use the term *trinitas*. There was an almost uninterrupted controversy about this doctrine in the ancient church, and a number of views were proscribed by the church as heretical. Among them were those of the Ebionites, who regarded Jesus as a mere man; of the Sabellians, according to whom the Father, the Son, and the Holy Ghost were only the different forms in which the one God reveals himself to men; of the Arians, who taught that the Son was not coeternal with the Father, but created by him before the creation of the world, and therefore subordinate to the Father; of the Macedonians, who denied the personality of the Holy Ghost; and many others. The doctrine of the church was fixed by the councils of Nice (325) and Constantinople (381), which declared that the Son and Spirit were coequal with the Father in the divine unity, that the Son was eternally begotten by the

Father, and that the Spirit was proceeding from the Father. The western church, at the synod of Toledo (589), declared that the Holy Ghost proceeded also from the Son (*filioque*); but the Greeks protested against this change of the creed as an innovation, and the phrase *filioque* has remained up to the present day one of the chief hindrances of a reunion between the Greek and the Roman Catholic churches. The symbolic books of the Lutheran and Reformed churches retained the Roman Catholic doctrine of the Trinity unchanged; but it has been attacked ever since the 16th century, as contrary to both the Bible and sound reason, by a large number of theologians and by several new denominations, as the Socinians, the German theosophists (Weigel, Boehm, &c.), the Unitarians, and the Universalists. Swedenborg referred the Trinity to the person of Christ, teaching a trinity, not of persons, but of the person, by which he understood that that which is divine in the nature of Christ is the Father, that the divine which is united to the human is the Son, and the divine which proceeds from him is the Holy Spirit. The spread of rationalism in the Lutheran and Reformed churches undermined for some time the belief in the Trinity among a large portion of German theologians. Kant thought that Father, Son, and Spirit designated only three fundamental qualities in the Deity, power, wisdom, and love, or three agencies of God, creation, preservation, and government. Hegel and Schelling attempted to give to the doctrine of the Trinity a speculative basis; and after their example the modern dogmatic theology of Germany has in general undertaken an apology of the doctrine of the Trinity on speculative as well as theological grounds. A number of supranaturalist theologians, however, do not hold the strict doctrine of ecclesiastical orthodoxy, as defined by the councils of Nice and Constantinople, and the view of Sabellius especially has found in modern times many advocates.—Complete and exhaustive works on the history of the doctrine of the Trinity have been published by Baur (*Die christliche Lehre von der Dreieinigkeit*, Tübingen, 1841), and Meier (*Die Lehre von der Trinität in historischer Entwickelung*, Hamburg, 1844).

TRINITY. I. An E. co. of Texas, formed since 1850, bounded N. E. by the Neches and S. W. by the Trinity river, and drained by several creeks; area, about 700 sq. m.; pop. in 1860, 4,392, of whom 959 were slaves. The surface is nearly level, and the soil fertile. Corn and cotton are the staples. Capital, Sumter. II. A N. W. co. of California, bounded E. by the Coast range, and drained by tributaries of Trinity and Eel rivers; area, about 3,000 sq. m.; pop. in 1860, 5,125. The surface is generally hilly, and in the E. part mountainous, containing Mt. Linn, the highest peak of the range. The productions in 1858 were 19,060 bushels of wheat, 25,170 of barley, and 4,660 of oats; and in 1856 there were returned 1,228 tons of hay and 169,150 bushels of potatoes. There were 4 grist mills and 18 saw mills. Gold mining is largely prosecuted, and other valuable minerals are found. Capital, Weaverville.

TRINITY. I. A river of Texas, formed by two streams, called the West fork and Elm fork, which rise near the N. boundary of the state, and after a length of about 150 m. each unite in Dallas co., whence the main stream flows in a tortuous but generally S. S. E. direction to the N. extremity of Galveston bay, about 40 m. from Galveston city. Its whole course lies through a valley of great fertility, occupied in part by extensive plantations of corn, cotton, rice, and sugar; but the greater part is still unoccupied and unexplored. The length of the main stream is about 550 m., and steamboats ascend from 350 to 500 m. in time of high water, the stream being principally fed by rains, which are abundant from February to May. II. A river of California, rising by two forks near the Coast range in Trinity co., about lat. 40° 30′ N., and flowing S. W. and then N. W. into the Klamath river in lat. 41° 20′ N. It is celebrated for its rich gold mines.

TRINITY COLLEGE, an institution of learning at Hartford, Conn., under the control of the Protestant Episcopal church. Its charter was obtained in 1823, under the name of Washington college, and an endowment of $50,000 subscribed within a year; the college buildings were commenced in 1824, and the college regularly organized and recitations held in the autumn of the same year. Its first president was the Rt. Rev. Dr. Thomas C. Brownell, bishop of Connecticut, who resigned in 1831 and was succeeded by the Rev. N. S. Wheaton, D.D. In 1837, on his resignation, the Rev. Silas Totten, D.D., was elected president, and during his administration, in 1845, its name was changed to Trinity college. He was succeeded in 1848 by the Rev. John Williams, D.D., now assistant bishop of Connecticut, who in 1853 resigned, and the Rev. Daniel R. Goodwin, D.D., previously professor of modern languages in Bowdoin college, became his successor. In 1860 Dr. Goodwin was elected provost of the university of Pennsylvania, and the present incumbent, Samuel Eliot, then professor of history, was chosen president. At different periods of its history the college has received endowments amounting to about $150,000, of which $16,000 has been contributed by the state and the remainder by its friends. Among its professors have been Dr. S. F. Jarvis, in the chair of oriental literature; Bishop Horatio Potter, in that of mathematics and natural philosophy; Bishop Doane in that of rhetoric and oratory; Charles Davies, LL.D., in that of mathematics; Thomas W. Coit, D.D., in that of ecclesiastical history; George C. Shattuck in that of institutes of medicine; and the Hon. W. W. Ellsworth in that of law. In 1861 the number of professors and other instructors was 14, of alumni 500, and of students 70; and the libraries comprised 13,500 volumes.

TRIO, a musical composition for 3 voices or instruments, one of the parts of which must make a third with the base and the other a fifth or octave. In a minuet it signifies the passage, formerly called the *menuetto*, which alternates with the minuet proper.

TRIPANG. See Sea Cucumber, vol. xiv. p. 467.

TRIPOD (Gr. τρεις, three, and πους, a foot), literally, any vessel, table, seat, or other utensil supported on 3 legs. The term is most commonly applied to the bronze chair or altar in the temple of Apollo at Delphi, on which the Pythian priestess sat while giving responses to those consulting the Delphic oracle. Numerous imitations of the Delphic tripod were employed in the worship of other deities, particularly Bacchus, in games celebrated in honor of Apollo, at which it was often given as a prize, and on similar solemn occasions; and in domestic use it assumed many graceful variations of the original form. Tables, caldrons for boiling food, and *crateres*, or vessels in which wine was mixed with water at the banquets of the ancients, were frequently tripods richly ornamented. Fine specimens have been exhumed at Pompeii.

TRIPOLI (called by the natives *Tarabul*), a country of N. Africa, forming one of the Barbary states, nominally dependent on the Turkish empire, bounded N. by the Mediterranean, E. by the state of Barca, S. by Fezzan and the desert of Sahara, and W. by the Sahara and Tunis, between lat. 28° and 33° 30′ N., and long. 10° and 20° E.; extreme length about 800 m., breadth from 100 to 200 m.; area estimated at 105,000 sq. m.; pop. 1,500,000. Though the sea coast extends 800 m., there is only one good harbor, that of Tripoli, in its entire length. In its E. part, between Cape Mesurata and the town of Bengazi, there is a remarkable indentation called by the ancients Syrtis Major, now the gulf of Sidra or Sert. (See Syrtis.) The shore to the W. of Cape Sciarra is low and sandy; but to the E. it becomes higher, and has many rocky points that afford shelter to small craft, and there is good anchorage in the bay of Bushaifa in 6 fathoms water. The soil is exceedingly porous, and most of the streams only flow during the rainy season. The interior of the country is very imperfectly known. The N. E. part contains extensive tracts of barren sand, and partakes of the nature of the desert; but the S. E. is traversed by the Black mountains, an offset of the Atlas, which descend in terraces enclosing several fertile tracts. Toward the W. the surface becomes diversified, and is traversed by two ranges of mountains, which run nearly parallel with the sea, the N. range about 20 m. from the shore, and the S. 30 m. further inland. The former has a general height of about 4,000 feet, and is visible from the coast. These mountains are of volcanic origin, and many of the summits terminate in conical peaks. The space between the ranges contains many tracts of elevated table land, with a fertile soil produced by the decomposition of lava and basalt. Salt and sulphur are the only minerals known to be worked. Some of this land is carefully cultivated, and irrigated with water collected for the purpose in large tanks. Abundant crops of grain are raised, and on the sides of the hills vines, olives, figs, almonds, and other fruits grow luxuriantly. There are extensive natural pastures upon which cattle are reared in great numbers. The most fertile part of Tripoli, however, is the country which surrounds the capital. This tract, called the Meshea, extends about 15 m. along the shore, and is about 5 m. broad, and produces heavy crops of wheat, barley, millet, and Indian corn. Palm trees and olives are grown, together with all kinds of fruit that can be produced in a temperate climate. The country which lies S. of the table land contains very little productive land. In places it consists of a plain of loose sand, and in others of gravel from which the sand has been swept by the wind, while there are places covered with detached stones, and a few spots have stunted bushes. The water, which is only found by digging from 100 to 200 feet, is bitter and brackish. In the few spots where barley and durra can be raised there are villages, the inhabitants of which live in constant dread of the wandering tribes of the adjacent desert. Heavy rain falls in the N. part of the country from November to March, but during the rest of the year months often pass without a single shower, and the heat becomes very great, especially when the sirocco blows. In winter the weather is exceedingly variable, and frosts occur at night, while the temperature during the day often exceeds 70°. The horses of Tripoli are of a very superior breed, and cattle are numerous on the table land. Camels are extensively used as beasts of burden, and sheep and poultry are exported. Of wild animals the most common are wolves, foxes, hyænas, jackals, gazelles, antelopes, rabbits, hares, hedgehogs, jerboas, and a small animal not unlike a Guinea pig, called *gundy*. Ostriches frequent the borders of the deserts; and most of the birds common to the neighboring countries are found in Tripoli. Swarms of locusts frequently come from the Sahara, and are eaten with great relish by the poor; they are salted in large quantities, and appear to constitute an important article of inland trade. There are many bees in the hilly regions.—Tripoli contains numerous remains of antiquity; and there are ruins of temples, theatres, and aqueducts of Roman construction. Many of these ruins have been buried deeply in sand; but they can still be traced in the city of Tripoli, and in Tripoli Vecchia, where there is an amphitheatre 148 feet in diameter, still entire, with 5 rows of seats, and part of one of the great Roman ways, with the ruins of ancient buildings upon both sides. Coins, gems, and intaglios have been found in considerable numbers.—The population comprises Arabs, Jews, Moors, Turks, Mamelukes, Christians, and negro slaves. The Arabs are of the same family as the Bedouins of Arabia, and their language does not differ materially from Arabic. They form the bulk of the population, and generally reside in the country districts. The towns are mostly peopled by Moors, Jews, and negro slaves, none of the other races being very numerous. Some of the Arabs have fixed homes and reside in villages, but many of them are nomadic.—There are some manufactures of woollen goods, and cloth for tents is made of goats' hair. The trade of Tripoli is very considerable. The exports by sea consist chiefly of wool, cattle, hides, gold dust, ostrich feathers, ivory, gum, dried fruits, saffron, senna, and different kinds of drugs, barilla, and sheep's fat; and the imports are clothes of every description, spices, sugar, coffee, spirits, arms, cutlery, hardware, &c. Caravans arrive from the interior of Africa twice a year, and bring slaves, gold dust, &c., which are exchanged for goods of European manufacture. The annual caravans from Morocco, on their way to and from Mecca, pass through the country, but their size has diminished greatly of late years.—Like the governments of the other Barbary states, that of Tripoli is a complete despotism. The bey is generally selected from among the Turkish officers resident at the capital, and confirmed by the sultan. In former times the revenue was chiefly derived from the prizes taken by corsairs, and the sale of the Europeans captured into slavery; but since these sources have been cut off, a system of monopolies exceedingly injurious to trade has been adopted. The bey of Fezzan and the sheiks of Barca and some neighboring tribes pay tribute, and a land tax is imposed, together with one on Jews and merchants, as well as on exports and imports. The religion is almost entirely Mohammedanism; but the temperance enjoined by the prophet is not practised in Tripoli. Wine shops are kept openly, and receive the sanction of the government by paying a heavy license fee. Education is not much attended to, and the people are exceedingly ignorant and bigoted.—After the destruction of Carthage, Tripoli, then called Africa Syrtica, became a Roman province, and the 3 cities of Sabrata or Abrotonum, Œa, and Leptis Magna, under the name of Tripolis, formed a kind of federal union. It was conquered by the Vandals in the 5th century, and by the Mohammedans under the caliph Omar and his successor. After the caliphate was dissolved Tripoli became an independent state. The capital was taken by the king of Sicily in 1146, and retaken by Yakoub and the fortifications destroyed in 1184. It was afterward subject to Tunis till about 1510, when it was conquered by the Spaniards; and it was ceded by the emperor Charles V. to the knights of St. John of Jerusalem after their expulsion from Rhodes in 1530. The only stronghold then consisted of a castle, against which Sultan Solyman sent an expedition in 1551, when the knights were expelled, and the tract of country which at present constitutes the pashalic was annexed to Tripoli. The famous corsair Dragut, who had assisted at its capture, was made the first governor, and he initiated a system of piracy which was continued for centuries. The Christian nations and their commerce were the objects of attack, and all prisoners taken were sold into slavery. The capital was bombarded by the French fleet in 1683, when the pasha professed submission to Louis XIV. Notwithstanding this, however, and a war with the United States growing out of the practice, the Tripolitans continued their depredations upon foreign shipping even down to the year 1816, when a British force visited Tripoli and compelled the bey to renounce piracy and agree to treat all future prisoners according to the usages common among civilized nations. Though Tripoli is nominally a dependency of the Ottoman empire, the allegiance is principally due to the fact of the sultan being the chief of the Mohammedan religion; and the bey enters into treaties with foreign powers without consulting any superior. At first the governors or beys were appointed from Constantinople, and supported by a Turkish garrison; but a Moorish chief who was second in command rebelled successfully in 1713 and was proclaimed bey by the people. The government became hereditary in his family, and continued so till 1832, when, in consequence of more than ordinary oppression and tyranny, the last bey of the line was obliged to abdicate, and the Porte has since resumed its nominal authority. The chiefs of the interior acknowledge but slight allegiance, and keep on friendly terms with the bey merely because the commerce carried on through the capital is advantageous to them. The Arabs sometimes resort to open hostilities, and so late as 1855 they defeated the bey troops, and advanced to the immediate vicinity of the capital.—TRIPOLI (anc. *Œa*), the capital, is situated on the Mediterranean, 600 m. S. E. from Algiers, and 300 m. S. from the coast of Sicily, in lat. 32° 54′ N., long. 13° 11′ E.; pop. about 20,000. It stands upon a rocky promontory with the sea on the N. and E. sides, and is joined to the mainland on the S. and W. by a sandy plain. Toward the land it is defended by a wall flanked by bastions, and to seaward there are strong batteries and a castle at the S. E. point, which is the residence of the bey. The streets are exceedingly narrow and uneven, and the houses are generally mean and huddled together without regularity. They are nearly all one story high, without windows toward the streets, built of stones and mud, and whitewashed. Tripoli contains many mosques, 6 of which are handsome buildings, ornamented with numerous minarets. The roof of the great mosque is formed by a number of small cupolas, supported by 16 marble columns, supposed to have been taken from a Christian church. It is richly ornamented in the interior, and said to have a very imposing effect. There are 2 or 3 Christian churches, a Franciscan convent, and several synagogues; and all religions are tolerated within the limits of the city. The pasha's residence is an immense building of very irregular appearance, having been constructed at different times. There are numerous caravansaries for the accommodation of travellers and merchants; and many of the public baths are built of marble and ornamented with cupolas. There are two bazaars, one of which is occupied by small shops, and the other by slave dealers, who bring the slaves from the interior. Woollen goods (particularly carpets), leather, and potash are manufactured. A great part of the trade of the state, as well as that of the interior of Africa, is centred in Tripoli. The traders are principally Jews, who have monopolies farmed out to them by the government. The foreign trade by sea is carried on chiefly with Malta, Marseilles, Leghorn, Trieste, and several towns of the Levant; and by land by means of caravans with all the surrounding countries as far as Morocco, Timbuctoo, and Mecca. Tripoli contains several remains of antiquity, the most remarkable of which is a triumphal arch constructed of large blocks of marble, erected in A. D. 164 to the Roman emperors M. Aurelius Antoninus and Lucius Verus; the inscription is perfect, although the sculptures are greatly defaced. It is now used as a storehouse for goods.

TRIPOLI, or Tarabloos (anc. *Tripolis*), a seaport town of Syria, on the shore of the Mediterranean, in lat. 34° 26′ N., long. 35° 49′ E., 48 m. N. by E. from Beyrout, and 94 m. N. W. from Damascus; pop. about 15,000, one half Greek Catholics. It stands at the foot of an offset of Mt. Lebanon, on a small triangular plain, with the sea at a little distance on the N. and S. sides. A hill on the E. is crowned by an old castle; and the town is divided into two parts by the Nahr Kadesha, that to the N. being the port. The harbor is sheltered by a projecting point of land, but is small and shallow, and is not considered safe. There are several mosques, most of which were formerly Christian churches, and are generally fine buildings. Tripoli is one of the neatest towns in Syria, and is surrounded by many fine gardens and groves of orange and other fruit trees; but the ground in the neighborhood is marshy, and the climate is in consequence unhealthy at certain seasons. It is a place of considerable trade, the exports consisting chiefly of silk, wool, cotton, tobacco, wax, oil, cochineal, galls, soap, and especially sponges, the fishery of which occupies a large number of the inhabitants. The commerce is chiefly in the hands of Greeks. French steamers touch here 4 times a month. It is the see of a Greek bishop, and the residence of several consuls.—Tripolis was an important maritime town of Phœnicia, and derived its name from being the colony of the three cities of Tyre, Sidon, and Aradus, each holding a separate quarter of it. It was taken by the crusaders in 1109, who burned a valuable library, and erected it into a county for Raymond of Toulouse.

TRIPOLI, an earthy substance, originally procured from Tripoli in Africa, used as a polishing material, of fine sharp grain, yellowish gray or whitish, burning white. It consists almost entirely of silica, and when examined by the microscope is found to be composed of the exuviæ or skeletons of infusoria, the families of which are readily recognized. Specimens of it from Billen in Bohemia, Santafiora in Tuscany, the Isle of France, and Francisbad near Eger, have been examined by Ehrenberg. The substance has sometimes been confounded with the English rotten stone.

TRIPOLITZA, or Tripolis, a town of Greece, in the Morea, capital of the nome of Arcadia, 22 m. S. W. from Argos; pop. 8,800. It is situated in a plain 3,000 feet above the sea, and owes its name, signifying triple city, to its being the modern representative of the cities of Mantinea, Tegea, and Pallantium, which occupied the same plain. Before the revolution it was the residence of a Turkish pasha and capital of the Morea, and had 20,000 inhabitants. The Greeks took it in 1821 and put the inhabitants to the sword, 8,000 male Turks having perished, beside women and children. In revenge for this outrage, Ibrahim Pasha, having occupied it in 1825, destroyed literally every house in the place. It has since been partially rebuilt. The ruins of Mantinea may be seen at Paleopoli, about 8 m. to the N., and of Tegea at Piali, nearly the same distance S. (See Mantinea, and Tegea.) Pallantium probably occupied the site of Tripolitza itself.

TRIPTOLEMUS, in Greek mythology, a son of Oceanus and Terra, or, according to another tradition, of Celeus, king of Attica, and Neæra, also called Metanira or Polymnia. He was born at Eleusis, and while still young he was cured of a dangerous illness by Ceres, who had been hospitably entertained by his father while engaged in the search for her daughter. To repay the kindness of Celeus, the goddess took especial care of Triptolemus, and put him on the fire in order to burn out whatever particles of mortality he had derived from his parents. But his mother, discovering her, prevented the accomplishment of her design. Ceres, unable to make him immortal, taught him agriculture, how to sow corn and to make bread, and also presented him with her dragon chariot, with which he rode over all the earth, distributing corn to all its inhabitants. Afterward he reigned at Eleusis. Triptolemus was the great hero of the Eleusinian mysteries.

TRISMEGISTUS. See Hermes Trismegistus.

TRISSINO, Giovanni Giorgio, an Italian author, born in Vicenza in 1478, died in Rome in 1550. He studied the Greek language under Chalcondylas, and became also an elegant Latin and Italian writer. At a mature age he was employed by Popes Leo X. and Clement VII. upon several diplomatic missions. He wrote *Sofonisba*, the first Italian regular tragedy;

L'Italia liberata dai Goti, an epic in blank verse; and *La poetica*, a treatise on poetical art. To his suggestion is attributed the present method of writing the *v* and *j* of the Roman alphabet differently from the *u* and *i* with which they were before confounded. He also endeavored to introduce distinct signs for the different sounds of *o* and *e*.

TRISTAN DA CUNHA, the largest of a cluster of three islands in the S. Atlantic ocean, claimed by Great Britain, lying S. S. E. from St. Helena, in lat. 37° 6′ S., long. 12° 2′ W. The others are called Nightingale and Inaccessible islands, and can only be approached in a calm. Tristan da Cunha is about 20 m. in circumference, and rises abruptly from the water on 3 sides to a height of 8,326 feet. On the N. side an extensive plain stretches along the base of the mountain, which is an extinct volcano. Vessels touching can procure supplies. It was named after a Portuguese navigator who discovered it in 1506.

TRITON, in Greek and Roman mythology, a marine deity, the son of Neptune. He was represented as having the form of a man above and that of a fish below, and as bearing a conch-shell trumpet, the sound of which soothed the turbulence of the waters. Tritons are mentioned in the plural as identical with the fabulous mermen of the northern nations.

TRITON, the proper name of the tailed batrachians of the old genus *triton* (Laur.), generally called newts or water salamanders; they all belong to the northern hemisphere, and their species are most numerous in North America. The tail is depressed and adapted for swimming in most, though many are not strictly aquatic, but pass much of their life on the land, some visiting the water only during the breeding season; indeed, by reference to the article SALAMANDER it will be seen that the distinction into terrestrial and aquatic species is very indefinite, species with either of these habits being found in one genus. In the breeding season, in the spring, the males acquire a fin-like fringe along the back and tail and membranous appendages to the toes; the species are difficult to distinguish on account of the varieties of sex, age, and season. Reproduction takes place by means of eggs, which are fecundated before they are deposited, and the young resemble tadpoles in form and gills. The most carefully studied species is the great triton or water newt of Great Britain (*T. palustris*, Flem.), about 6 inches long, of which the tail is about ⅖; this species will suffice for the generic description. The body is naked, but covered with warty tubercles, and with glandular pores behind and over eyes and along sides; toes without nails, 4 anterior and 5 posterior; the dorsal and caudal crests separate; tongue slightly free on sides, and more free and pointed behind; palate with a double longitudinal series of teeth; no parotids nor glands along the back. The smooth-skinned species, without lateral pores and with a continuous dorsal and caudal crest, have been noticed under EFT. The head is flattened, nose rounded, gape large, teeth numerous and small, and the neck hardly distinct from the head and body. It is common in ponds and ditches, and one of the most aquatic of the family, swimming by means of the tail, the legs being turned back against the body; the legs are used as balancers in the water, and for a slow and feeble creeping on land; the skin comes off in shreds in the water, and is swallowed. It is said not to be able to breed until the 3d year, and to pass the entire period between the end of the tadpole state and the breeding season on the land, the young in winter hiding in solitary holes in the ground, and the adults hibernating in company rolled together in a ball a few inches in diameter. The eggs are deposited on the leaves of aquatic plants which are folded around them, one egg to each leaf; the anterior lobes of the branchiæ are modified into prehensile organs by which the tadpole fixes itself to bodies under water, being absorbed when the anterior feet are sufficiently developed; the young, which are born in June or July, remain, according to Bell, without much change till the following spring, when they acquire legs and leave the water, their parents in a few weeks resuming a terrestrial existence. In the water they are voracious, feeding on aquatic animals, insects and larvæ, the tadpoles of the frog, and even those of their own species. They are noted for their tenacity of life under mutilation and exposure to severe cold, and for their power of reproducing lost parts; yet with all this tenacity of life, it is remarkable, says Prince Musignano, that they should die in violent convulsions on having a little salt sprinkled upon the body. It is blackish or light brown above with darker round spots, and bright reddish orange below with round black spots, and the sides dotted with white.—The common many-spotted triton of the Atlantic states (*T. dorsalis*, Harlan; genus *notophthalmus*, Raf.) is about 4 inches long, of which the tail is one half; it is olive or greenish brown above, with a row of circular vermilion spots on each side, and below orange studded with small black dots; eyes prominent, with flame-colored iris; posterior limbs twice as large as anterior; it is eminently aquatic, and dies soon out of water from the drying of the skin; it is torpid only in the severest weather; it is found from Maine to Georgia, forming a very lively and interesting animal for the fresh water aquarium, and easily obtained. The tiger triton (*T. tigrinus*, Holbr.; genus *ambystoma*, Tschudi) is 6½ inches long, bluish black above and on limbs, with irregular markings of lemon color, and below ashy with dusky yellow blotches; it is found in the New England and middle states. The black triton (*T. niger*, Holbr.; genus *desmognathus*, Baird) is 4⅓ inches long, black above, with a tinge of blue, and purplish below; it is found from Massachusetts to Florida and Louisiana, and is said to be entirely aquatic. The great triton (*T. tingens*, Holbr.; genus *ambystoma*, Tsch.) is 10 to 18 inches long, bluish slate above, with irregular pale ash blotches, throat dark brown, and abdomen slate-colored; this is the largest species, eminently aquatic, and found in the western states.—The name of TRITON is also given to a genus of gasteropod mollusks of the murex family, having a conical and elongated shell, spirally convoluted. The *T. variegatum* (Lam.), 12 to 16 inches long, from the Indian seas, is the well known sea conch or trumpet of the god Triton; this species, as well as the *T. australe* (Lam.), is used by the Polynesians as a horn; by blowing in the shell through a hole in the apex, a loud and mellow sound is produced.

TRIUMPH (Lat. *triumphus*), generally, a solemn procession for the purpose of celebrating a victory. Although honors of this kind have been bestowed from time immemorial by warlike races upon victorious generals, they became nowhere else so closely identified with national habits and institutions as among the ancient Romans, who encouraged the observance of them as a stimulus to martial exploits. Hence a triumph may be defined as the highest military honor that could be obtained by a Roman general, who entered the city in a chariot drawn by 4 horses, preceded by his captives and spoils and followed by his army, with which escort he passed along the Via Sacra, and ascending to the capitol sacrificed a bull to Jupiter. A triumph was granted by the senate to a general who had gained important successes by land or sea, if he had already held one of the great offices of state; if the victory had been gained under his auspices and with his troops; if the advantage had been positive and the number of enemies slain in a single battle at least 5,000, and if it had been gained over a foreign enemy and not in a civil war; if the national dominion had been extended, and not merely recovered or relieved from the presence of the enemy; and if the war had been actually concluded so as to permit of the army's being withdrawn from the conquered country. Occasional deviations from these conditions are recorded, but they were in the main strictly observed. The general claiming the triumph having sent to the senate an account of his exploits, that body, if the intelligence proved satisfactory, generally decreed a public thanksgiving, called a *supplicatio*; and at the conclusion of the war he met them without the city walls to urge his pretensions in person. The right of the senate to bestow triumphs, however, was not an exclusive prerogative, instances being on record in which the comitia of the tribes assumed it, and even where generals triumphed in defiance of the senate and the people. But a disappointed general commonly contented himself with going through the forms of a triumph on the Alban mount. The consent of the senate having been obtained, and a sum of money voted to defray the necessary expenses, the successful general was invested with the *imperium* within the city for the day of triumph, until which occasion he remained outside of the walls. The procession, at first simple and impressive, was in later times transformed into a pageant of extraordinary splendor, and minute regulations prescribed the arrangement of its various parts. The populace in holiday attire were present along the whole route, altars and temples were adorned with garlands, and a general festival prevailed. The general himself, attired in a gold-embroidered robe and flowered tunic, and bearing in one hand a laurel bough and in the other a sceptre, stood upright in a circular chariot drawn by 4 horses, in which was also stationed a slave, who, according to some authorities, reminded him amid the acclamations of the multitude that he was but mortal. The inhuman practice also prevailed of putting to death several of the captive leaders while the procession was ascending the Capitoline hill. After the sacrifice was performed at the temple of Jupiter Capitolinus, the general deposited his laurel wreath in the lap of the god, and the ceremonies of the day ended with a public banquet. Naval triumphs were similar in character, but fewer in number, and generally on a smaller scale. After the overthrow of the republic, the emperors, in virtue of their authority as commanders-in-chief of the armies of the state, claimed the exclusive right of celebrating triumphs; and until A. D. 534, when Belisarius entered Constantinople in triumph after the overthrow of the Vandal kingdom in Africa, no subject had for more than 5 centuries enjoyed that distinction. This was the 350th triumph in Roman history, and the last ever celebrated. A lesser kind of triumph, called an ovation (*ovatio*) from the practice of sacrificing a sheep (*ovis*) instead of a bull, was granted to a general whose success had been considerable, though not of a character to entitle him to a triumph. In such cases the victor entered the city on foot, attended by a less imposing retinue, a conspicuous feature of which was a numerous band of flute players.

TRIUMPHAL ARCH. See ARCH.

TRIUMPHAL COLUMN. See COLUMN.

TRIUMVIRATE, an office filled coördinately by 3 persons. Several magistracies of this description were recognized in the Roman government, of which the most important was that for the regulation of public affairs—*triumviri reipublicæ constituendæ*. Though magistrates with this title are thought to have been appointed as early as 360 B. C., there is no certain mention of them till toward the close of the republic, when the supreme power was shared between Octavius, Antony, and Lepidus, as triumvirs. They received the office for 5 years in 43 B. C., and upon the expiration of that term for 5 years more. The coalition between Julius Cæsar, Pompey, and Crassus, in 60 B. C., is often called a triumvirate, but improperly, as they were never invested with any office under that title. Administration by triumvirs was apparently much favored by Roman legislators. A triumvirate was instituted in 292 B. C. of officers to inquire into all capital crimes (*triumviri capitales*); another superintended the formation of every colony (*triumviri coloniæ deducendæ*); another was charged with the prevention of fires, and went the rounds of the city every night for that purpose (*triumviri nocturni*); and there were many other triumvirates of minor importance, either permanent or temporary.

TROCHEE (Gr. *τρεχω*, to run), in poetry, a foot consisting of a long and a short syllable. It is also called choreus, and is especially used in verse requiring rapid movement, from which circumstance it derives its name. Trochaic verse is generally employed in lines of 2, 4, and 6 feet, and the trochee (- ⏑) interchanges easily with the dactyl (- ⏑ ⏑), tribrach (⏑ ⏑ ⏑), anapæst (⏑ ⏑ -), and spondee (- -). In addition to the trochaic verse of 2, 4, and 6 feet, known to the ancients and the moderns, the latter have also employed the trochaic verse of 5 and of 7 feet, although the tetrameter is the one principally in use.

TRŒZEN, an ancient city of Greece, situated in a fertile plain in a territory of the same name, forming the S. E. corner of Argolis. It was founded probably by the Ionians, and according to Homer was subject at the time of the Trojan war to Argos, from which it afterward received a Doric colony. Subsequently it became a prominent maritime city, founded Halicarnassus and Myndus in Caria, and probably Pæstum in Magna Græcia, and was conspicuous in the wars with Persia, its harbor being the rendezvous of the Grecian fleet after the sea fight at Artemisium. During the Peloponnesian, Corinthian, and other wars, it adhered to the side of Sparta. After the establishment of the Macedonian rule over Greece it was in the hands of various contending parties, and continued a place of some importance until the time of Pausanias, who describes its public buildings in detail; but after this period we have no account of its history. The ruins of the ancient city lie near the village of Damala, and consist principally of Hellenic foundations with Frankish or Byzantine superstructures. In 1827 the Greek national assembly was held here, at which Capo d'Istria was chosen president for 7 years. Trœzen is celebrated as the birthplace of the Attic hero Theseus.

TROGLODYTES (Gr. *τρωγλοδυτης*, from *τρωγλη*, a cave, and *δυω*, to enter), the name given by the ancients to tribes of men who resided in caves. Several such are mentioned by ancient writers as inhabiting parts of Ethiopia, upper Egypt, the borders of the Red sea, Mœsia, Mauritania, and the northern part of the Caucasus. At the present time, in part of Arabia, the mountainous region encompassing the wadys are filled with caves, which have been converted into permanent habitations by half savage tribes of Bedouins, and it is probable that these belong to the same race as the troglodytic population of Ptolemy and other Greek geographers. In the early history of the Christian church the name was also applied to certain heretics, who, rejected by all parties, held their meetings in caves.—In natural history, Linnæus placed the African orang-outang under the genus *homo* with the specific name of *troglodytes*, next to *homo sapiens;* and this is the *troglodytes niger* of Geoffroy and the *simia troglodytes* of Blumenbach. The term is now applied to a genus which includes the chimpanzee and the gorilla, and also to a genus of the *troglodytinæ* or wren family of birds.

TROGON, and Couroucou, names given to the fissirostral birds of the family *trogonidæ*, the second name being derived from their peculiar melancholy cry. The bill is short, strong, curved, broader than high, triangular seen from above, with the margins and tip usually serrated, the base provided with tufts of bristles, and the gape wide; wings moderate and rounded; tarsi short and weak, more or less feathered; toes of unequal length, and arranged in 2 pairs, the inner being turned backward. There are about 40 species in the tropical regions of both hemispheres, but especially numerous in South America; they frequent thick and damp forests, feeding on insects, which they seize on the wing or pick from the bark of trees, and on fruits and berries; they are most active in morning and evening. A few live in the islands of the Indian archipelago, belonging to the genus *harpactes* (Swains.), having the edges of the bill smooth; and one genus (*apaloderma*, Swains.) in Africa, with only the lower mandible serrated; the American may be distinguished from the old world species by their barred tail. Though the neck and feet seem too short for the bulky body, the plumage is usually beautiful, often with metallic brilliancy, the splendor of their appearance being increased by the elegant and long tail. The eggs, 2 to 4, are laid in the holes of rotten trees, and several broods are raised in a year. The species vary in size from a thrush to a magpie; it is rare to obtain good specimens, as they frequent the highest trees of the thickest forests, and when shot lose many of the soft and delicate feathers by the fall to the ground; the skin is very tender, and renders the operation of skinning so difficult that the natives dry the body with the feathers on.—In the genus *trogon* (Mœhr.) the 1st quill is short and the 4th the longest. The red-bellied trogon (*T. curucui*, Linn.) is about a foot long, green above, red below, with the throat black, and the coverts and tail striped with the same; it is a native of Mexico. The peacock or splendid trogon (*calurus resplendens*, Swains.) has the edges of the bill smooth, the wing coverts long and curved, and the upper tail coverts greatly prolonged, entirely concealing the tail; it is larger than the last named, and the middle tail coverts are 3 to 3½ feet in length; it is of a beautiful bronzed and golden green above and on the throat, and scarlet below; it is found in Mexico and Central America, and was celebrated in the mythology of the ancient Mexicans; the gorgeous feathers of this and the preceding species are much prized by the natives for ornaments, and for use in their festivals, wars, and religious ceremonies; a crest of silky green feathers adds to the graceful appearance of the bird; it is the *T. pavoninus* (Temm.). There are many other species in Mexico and South America, generally green above and red or yellow below; the females are brownish where the males are green. The Asiatic species resemble the American ones in colors and habits.—For descriptions and figures of this brilliant family, see the "Monograph of the Trogonidæ," by John Gould (fol., London, 1838).

TROLLOPE, Frances (Milton), an English novelist, born in Heckfield, Hampshire, about 1780. She was the daughter of the Rev. William Milton, was well educated, and in 1809 was married to Anthony Trollope, barrister at law and a member of a distinguished family of Lincolnshire, who died at Bruges in 1835. A large portion of her married life was spent at Harrow, but in 1829 she visited the United States, where she remained 3 years. On her return she gave an account of her impressions in a work entitled "Domestic Manners of the Americans" (2 vols. 8vo. London, 1832), in which the indelicate and ridiculous phases of American character and habits were depicted in a manner which showed the writer's intimate acquaintance with the coarseness she described. The work was very successful in England, and created much bitter feeling at the time in the United States. She afterward produced in rapid succession so large a number of novels and accounts of travels, as to render her the most voluminous English authoress of the times. Her first work on America was followed by a novel entitled "The Refugee in America" (1832), and in 1836 by "The Adventures of Jonathan Jefferson Whitlaw." About 1844 she went to Florence, where she has since resided. Among her books of travels are: "Belgium and Western Germany in 1833" (2 vols., 1834); "Paris and the Parisians in 1835" (3 vols., 1836); "Vienna and the Austrians" (2 vols., 1838); "A Visit to Italy" (2 vols., 1842); and "Travels and Travellers" (2 vols., 1846). In the province of romance some of her best works are: "The Vicar of Wrexhill" (3 vols., 1837); "The Romance of Vienna" (1838); "The Widow Barnaby" (3 vols., 1839); "Life and Adventures of Michael Armstrong, a Factory Boy" (3 vols., 1840); "The Widow Married," a sequel to "The Widow Barnaby" (3 vols., 1840); "One Fault" (3 vols., 1840); and "Charles Chesterfield, or the Adventures of a Youth of Genius" (3 vols., 1841). Her later writings are much inferior to her earlier ones, but her works throughout are distinguished by keen observation, coarse satire, and amusing details. Her literary activity continued unabated until 1856.—Thomas Adolphus, an English author, son of the preceding (born in 1810), has published "The Girlhood of Catharine de' Medici," a biographical work under the title of "A Decade of Italian Women," "Paul the Pope and Paul the Friar" (1861), and other works, including several volumes of travels. His brother Anthony is a successful novelist. Occupying in Ireland the situation of a surveyor of the general post office, he began his literary career by two novels on Irish subjects, "The Macdermots of Ballycloran" (1847), and "The Kellys and the O'Kellys" (1848). These were followed by "La Vendée" (1850), a historical romance, "The Warden" (1858), "The Three Clerks," "Barchester Towers," Doctor Thorne" (1858), "The Bertrams" (1859), "Castle Richmond" (1860), "Framley Parsonage" (1861), and "Orley Farm," a serial novel begun in 1861. He writes largely both for English and American periodicals. He has also published "The West Indies and the Spanish Main." He has repeatedly visited the United States, his last journey in that country having taken place in 1861–'2.

TROMBONE, a brass wind instrument, supposed to be identical with the sackbut, and which constitutes one form of the trumpet. By means of sliding tubes great depth and power of tone are produced, and the instrument when judiciously employed, as in the last act of Mozart's *Don Giovanni*, is capable of splendid effects. It is however too frequently a noisy and unwelcome element in the orchestra, and is used to better purpose in military bands. Trombones are of 3 kinds, alto, tenor, and base; the first having a compass from C, the 2d space in the base, to G, an octave above the treble clef; the 2d from B, the 2d line in the base, to A, the 2d space in the treble; and the 3d from C, an octave below the 2d space in the base, to G, the 2d line in the treble.

TROMP, Marten Harpertzoon van, a Dutch admiral, born at Briel in 1597, killed July 29, 1653. He was the son of a naval officer, and when 8 years old was taken to sea by his father, who was killed in an engagement off the coast of Guinea with an English vessel. Young Van Tromp was taken prisoner, and from this time the events of his life are very uncertain until 1622, when he was a lieutenant on board a ship of the line. Two years afterward he commanded a frigate under Prince Maurice, and later served under Peit Hein, who fell dead by his side in an engagement with the Spaniards in August, 1629. About this time Van Tromp resigned his position, but in 1637 he was created by the stadtholder lieutenant-admiral, and placed in command of 11 vessels, with which he did so much damage to the Spanish shipping that he was presented with a gold chain by the states, and decorated with the insignia of the order of St. Michael by the French king. Created admiral of Holland in 1639, he attacked the Spanish fleet near Gravelines, and destroyed 5 ships of the line and 4 frigates; and in October of the same year he gained such a victory over the Spanish fleet under Oquendo, between Dunkirk and Nieuwport, that his name became famous throughout Europe. War breaking out between Holland and England in 1652, Van Tromp fought several great battles in that and the succeeding year (see BLAKE, ROBERT); and in July, 1653, he engaged the English fleet under Monk, near the coast of Holland, and during the conflict was shot through the head by a musket ball. "Courage, my boys," he exclaimed as he fell; "my course is ended with glory." Van Tromp was the most celebrated of the Dutch naval officers, and is said to have been successful in 33 engagements. He was buried with great splendor in the church at Delft.—CORNELIS VAN, a Dutch admiral, second son of the preceding, born in Rotterdam, Sept. 9, 1629, died in Amsterdam, May 29, 1691. Educated for his hereditary profession, he was appointed in his 19th year to the command of a ship destined to act against the African pirates, and two years later was created vice-admiral. From this time he was constantly engaged in naval enterprises until 1656, when he retired to private life, but resumed active employment in 1662. When war broke out between England and Holland in 1665, he was attached to the squadron commanded by Admiral Opdam, and was present at the battle of Solebay. Here, although the Dutch fleet was defeated, Van Tromp gained great reputation by the skilful manner in which he conducted the retreat. When a new squadron was fitted out, he was appointed to the chief command, although belonging to the party of the prince of Orange; but on the return of De Ruyter, he was superseded by that commander, under whom he refused to serve. In 1666 he was present at the naval battle in the Downs between De Ruyter and Monk, which lasted 4 days and ended in a victory for the former. In August of the same year he participated in another battle, and was successful in defeating the portion of the English fleet opposed to him, but, following his victory too far, was unable to render any assistance to De Ruyter, who was worsted. The latter commander complained of his conduct, and the states, on the advice of De Witt, deprived him of his command, and forbade his holding any communication with the fleet. In 1673, while war was again raging between Holland and the united powers of France and England, his commission was restored him by the prince of Orange, and a reconciliation took place between him and De Ruyter. In this war he distinguished himself highly. In 1675 he visited England, where he was received with great honor, and created a baronet by Charles II. In 1676 he was sent at the head of a fleet to assist Denmark, then carrying on a war with Sweden, and for his services was invested by the king of the former country with the order of the elephant, and raised to the dignity of count. On his return to Holland he succeeded De Ruyter as admiral lieutenant-general of the United Provinces. In 1691 he was appointed commander of the fleet destined to act against the French, but died before it was fully equipped and ready for sea.

TRONDHJEM. See DRONTHEIM.

TROOPIAL (Fr. *troupiale*), a name given to several species of the *icterinæ* and *agelainæ*, sub-families of American conirostral birds, in some respects resembling the starlings of the old world, and in others coming near the finches; they have the 9 primaries of the finches, but the bill is larger, straight, the base without bristles and the tip without a notch. The name is derived from their habit of associating in large troops. In the *icterinæ* the bill is generally longer than the head, straight and sharp-pointed; wings long and pointed, and tail usually wedge-shaped; toes moderate and formed for perching. The prevailing colors are yellow or orange and black; they are generally called orioles in North America, and a well known species has been described under BALTIMORE BIRD; hang-nest is another appropriate name, derived from their habit of suspending the nest from the extremity of slender branches.—The common troopial (*icterus vulgaris*, Daud.) is about 10 inches long, with a straight bill; back and abdomen yellow; head, neck all round, breast, and tail black; a white band on the wings; feathers of throat elongated and pointed; it is a native of northern South America and the West Indies, sometimes coming to the southern United States. They move in flocks, sometimes mingled with other species, and show a great partiality to the neighborhood of man, in whose cultivated fields they find a rich supply of insect food; they are excellent fliers, and equally at home on the ground or in trees; they are loquacious at all seasons of the year; their flesh is excellent. There are several other species in Mexico, Texas, and Central America. The orchard troopial (*I. spurius*, Bonap.) very much resembles the Baltimore oriole in the pattern of its colors, the orange red of the latter being replaced by dark chestnut, the tail entirely black and more graduated, and the bill slenderer and more curved. It frequents orchards, where it does good service in destroying insects in the blossoms; it is found throughout the United States from the Atlantic to the high central plains; the nest is hemispherical, 3 or 4 inches deep, made of long grasses very neatly interwoven, and suspended to drooping twigs, frequently of the weeping willow. It is often kept in a cage for its lively movements and pleasing song.—The only other genus of the *icterinæ* which can be mentioned here is *cassicus* (Cuv.), so called from *cassis* (a helmet), the bill rising on the forehead in a crescent shape; nostrils basal, naked, pierced in the substance of the bill; 3d and 4th quills longest, and tail long and graduated; tarsi and toes strongly scaled. There are about 20 species, peculiar to tropical America, living in the forests and also near human habitations, in vast troops; they eat fruits, berries, insects, and larvæ.

The nest is most ingeniously woven by both sexes, made of fibres and dried grasses, of a cylindrical or gourd-like form, and sometimes 3 feet in length; the lower part is hemispherical, the opening near the top, and the fabric suspended from the ends of slender twigs of high trees, out of the reach of monkeys and snakes; many nests are made on one tree, and sometimes those of different species together. They are docile in captivity, and learn to whistle and to articulate words; they are generally black, contrasted with bright yellow, especially toward the tail. The *C. cristatus* (Daud.), of Surinam, is about as large as a magpie; the *C. hæmorrhous* (Daud.) has a deep red rump and back.—In the sub-family *agelainæ* the bill is stout, short, conical, nearly straight, and sharp-pointed; tarsi as long as the middle toe; toes long and slender, and claws long and curved. Some of the birds of this sub-family have been described under BLACKBIRD, and BOBOLINK, specimens respectively of the genera *agelaius* (Vieill.) and *dolichonyx* (Swains.). *Leistes* (Vigors) resembles *agelaius*, but has a shorter tail; the species live generally in flocks in marshy places and on the borders of the great rivers of South America, on the ground or in low trees; the nest is suspended among the reeds near the ground, and is made of stalks of grass; the eggs are 3 or 4. In the genus *molothrus* (Swains.) the bill is short and stout, elevated at the base, and advancing on the forehead; wings long and pointed, 1st and 2d quills the longest; tail moderate and nearly even. Of the few species, only one is found in the United States, the cow blackbird, or cow-pen bird (*M. pecoris*, Swains.); it is about 8 inches long and 12 in alar extent; in the male the prevailing color is shining black, with a purplish and steel-blue gloss; the head, neck, and anterior part of breast, light chocolate brown; the female is light olivaceous brown; bill and feet black. It is found throughout the United States from the Atlantic to California, though probably not on the Pacific coast; it frequents fields and farmyards, following cattle, sometimes picking ticks from their backs, and at others feeding on the seeds, worms, and insects contained in their dung; large flocks migrate to the north to breed in spring, returning in autumn. The females have the habit of dropping their eggs, singly, into the nests of other smaller birds, as sparrows, warblers, and flycatchers; in New England the summer yellow bird's nest is most frequently selected; the eggs thus stealthily dropped are of about the same size as the true ones, and are more quickly hatched by the foster parents; of course, with this habit the cow birds do not pair, nor display the lasting attachment of ordinary birds. The European cuckoo has the same habit of abandoning her progeny to the care of strangers; but this is the more remarkable in the present bird, belonging to a family proverbial for the ingenuity with which their nests are constructed. If the cow bird's egg be deposited in a newly finished but empty nest, the makers generally abandon it; if in a nest already containing eggs, it is usually allowed to remain, though the makers are probably aware of the intrusion; the yellow bird has a way of disposing of the strange egg, which will be noticed under that title. The egg is pale grayish blue, with umber-brown dots and streaks, and the young is hatched in about a fortnight, the other eggs remaining unhatched; the intruder is fed by the foster parents, to the neglect of their own eggs, which, when the contained embryo has perished, are cast from the nest, and it is cared for long after it has left the nest. This species has no song, but a low muttering chuckle; the flesh is esteemed as food, and many are shot in the southern states; they roost among the reeds in swampy places, and come to feed in immense flocks, often in company with the red-winged blackbird and other troopials.

TROOST, GERARD, an American chemist and geologist, born in Bois-le-Duc, Holland, March 15, 1776, died in Nashville, Tenn., Aug. 14, 1850. He was educated at the university of Leyden, and, evincing a great proficiency in several branches of natural science, was in 1809 sent by Louis Bonaparte, king of Holland, on a tour of scientific observation in Java. The capture of the vessel in which he sailed by a privateer having interrupted this undertaking, he repaired in 1810 to the United States, where he passed the remainder of his life. Establishing himself in Philadelphia, he became a member of the academy of natural history, of which he was elected the first president, holding office until 1817. In 1814 he established the first alum works in the United States; and in 1825, having previously held for a short time the professorship of chemistry in the college of pharmacy in Philadelphia, he joined Robert Owen's community at New Harmony, from which he retired at the end of two years. Removing to Nashville in 1828, he was appointed professor of chemistry, mineralogy, and geology in the university of that city, and in 1831 geologist to the state of Tennessee, both of which positions he held until the close of his life. His reports on the geology of Tennessee, and numerous memoirs on geology and mineralogy published in the "Transactions" of scientific bodies in Europe and America, are his chief literary productions. His collections illustrating these subjects are said to have been the finest ever possessed by a single individual in the United States.

TROPE (Gr. τρεπω, to turn), in rhetoric, an expression used in a different sense, or, literally speaking, turned from its primary signification, for the purpose of presenting an idea in a lively or forcible manner. The term is generally considered to comprise the figures called metaphor, allegory, metonymy, synecdoche, and perhaps a few others. Many words or phrases originally employed as tropes have by constant use acquired a derivative signification which has superseded the original one.

TROPHONIUS, a Greek of the fabulous period, a son of Erginus, king of Orchomenus, or according to one legend, of Apollo. He built, with his brother Agamedes, the temple of Delphi, and the treasury of King Hyrieus in Bœotia. After his death he was worshipped as a hero, and had a celebrated oracle near Lebadea in Bœotia.

TROPHY (Gr. *τροπαιον*, from *τρεπω*, to turn, to defeat), literally, a memorial of victory erected on a field of battle. It consisted generally of the arms of slain enemies placed upon the trunk of a tree, and in later times upon a stone or metal pillar, with an explanatory inscription, and was consecrated to Jupiter or some other deity, whence it was regarded as inviolable. To the end also that hostile feelings might not be perpetuated, trophies were allowed to perish by natural causes, and any attempt to repair them when decayed was deemed sacrilegious. The practice of erecting them was common among the Greeks, and subsequent to 121 B. C. was adopted by the Romans, some of whose generals expended large sums in memorial works of this kind. These, however, were more frequently raised in Rome than on the field of battle, and in later times took the form of magnificent triumphal arches or columns.

TROPIC BIRD (*phaëton*, Linn.), a genus of web-footed oceanic birds, constituting the family *phaëtonidæ*. They are characterized by a long, strong, pointed bill, broad at the base, slightly curved, without nail and the edges finely serrated; nostrils at base of bill, lateral, and pervious; face covered with feathers; wings long and pointed, the first primary the longest; tarsi short and strong, feet small, and toes fully webbed; hind toe small; tail with 2 long, straw-like feathers, whence the French name *paille en queue* or straw-tail; sailors call them boatswain bird and marline-spike. In habits and appearance they come near the gulls and terns; they are chiefly confined to the tropics, so that the mariner knows, when they hover around his vessel, that he is in or near the tropical zone. Their powers of flight are great, and they are usually seen at considerable distances from land; they live almost entirely on the wing, and, when they do not return to the distant shore to roost, rest upon the surface of the ocean; they are excellent swimmers. The food consists of fish and other marine animals, which they dart upon from a great height; they are fond of following the shoals of flying fish, seizing them as they emerge from the sea to avoid the porpoises, tunnies, and other carnivorous enemies. They are not larger in the body than a pigeon, though longer; they congregate in considerable numbers at their breeding places, on rocky shores and desert islands, placing the nest on the ground or in holes in trees; the eggs are 2; their flesh is fishy and tough. The common tropic bird (*P. candidus*, Gray) is about 30 inches long and 38 in alar extent; it is a satiny white, the wings banded with black, and the head, back, and wings tinged with cream color or light pink; first 5 primaries black on the outer webs, and the shafts of the long tail feathers black to near the end, where they are white; a black mark over eyes to occiput; bill orange red and iris brown; tarsus and toes yellow at base, webs and claws black. It sometimes comes near the Florida coast, but is usually seen in the tropical Atlantic far from land. The long tail feathers of the *P. phœnicurus* (Gmel.), inhabiting the tropical Pacific, are of a bright red color, and are used as ornaments by the South sea islanders.

TROPICS (Gr. *τροπη*, a turn), in astronomy, two circles parallel to the equator, at such distance from it as is equal to the greatest recession of the sun from it toward the poles, or to the sun's greatest declination. That in the northern hemisphere is called the tropic of Cancer, and that in the southern the tropic of Capricorn, from their touching the ecliptic in the first points of those signs. (See CANCER, and CAPRICORN.) It is between the tropics that the sun's path is circumscribed, its annual movement being from one to the other and back again in the ecliptic.—In geography, the tropics, also known as that of Cancer and that of Capricorn, are the two parallels of latitude over which the sun is vertical at the solstices. (See SOLSTICE.)

TROPLONG, RAYMOND THÉODORE, a French jurist and magistrate, born at St. Gaudens, department of Haute-Garonne, Oct. 8, 1795. He entered the legal profession in 1815, and, after distinguishing himself as king's attorney at various places, was in 1833 appointed president in the royal court at Nancy. He now commenced publishing the work that entitles him to the highest rank among the French jurists, *Le droit civil expliqué* (28 vols. 8vo., 1833–'58). In 1840 he was elected a member of the academy of moral and political sciences, and in 1846 was made a peer by Louis Philippe. On the revolution of February he joined the Bonapartists, and, on Dec. 22, 1848, was appointed first president of the court of Paris. In the same year he published a tract, *De la propriété*, which was extensively circulated. An original member of the new senate, Jan. 25, 1852, he was appointed one of its vice-presidents, and in 1854 its president, becoming meanwhile president of the court of cassation and grand cross of the legion of honor; and in 1858 he was named a member of the privy council of the emperor. Beside the works above mentioned, he has written *De l'influence du Christianisme sur le droit civil des Romains* (1843; 2d ed., 1855), and *Du pouvoir de l'état sur l'enseignement* (8vo., 1844). He is also a contributor to the *Gazette des tribunaux*, the *Revue de législation*, and the *Moniteur*.

TROPPAU, a fortified town and the capital of Austrian Silesia, and of the circle and principality of Troppau, on the Oppa, a tributary of the Oder, 36 m. N. E. from Olmütz; pop. in 1857, 13,861: The city is well built, and has a castle of the princes of Lichtenstein, a gymnasium, a school for the sons of soldiers, a library, a cabinet of natural history, and a museum of national antiquities. Woollen, linen, soap, paper, and leather are manufactured. The diplomatic congress, afterward removed to Laybach, was held here in the autumn of 1820.

TROUBADOURS. See PROVENÇAL POETRY.

TROUGHTON, EDWARD, an English astronomical instrument maker, born in Oct. 1753, died in London, June 12, 1835. He entered the firm of his uncle and brother, who carried on business as mathematical instrument makers, and became highly distinguished for his success in the construction of astronomical instruments; and it was said of him that "he improved and extended every instrument that he touched, and that every astronomical instrument was in turn the subject of his attention." He wrote articles in the "Philosophical Transactions," and in the "Edinburgh Encyclopedia."

TROUP, a W. co. of Georgia, bordering on Alabama, and intersected by the Chattahoochee river; area, about 370 sq. m.; pop. in 1860, 16,879, of whom 10,002 were slaves. The surface is hilly and the soil generally fertile. The productions in 1850 were 14,481 bales of cotton, 687,205 bushels of Indian corn, 120,302 of oats, and 142,884 of sweet potatoes. There were 3 tanneries, a woollen factory, 32 churches, and 1,440 pupils attending public schools. It is intersected by the Atlanta and West Point railroad. Capital, La Grange.

TROUP, GEORGE M., an American statesman, born on the Tombigbee river, then in the territory of Georgia, in 1780, died in Laurens co., Ga., May 3, 1856. He was graduated at Princeton college in 1797, was admitted soon after to the bar, and upon reaching the age of 21 was elected a member of the state legislature. Between 1807 and 1815 he was a representative in congress from Georgia, and in 1816 was elected a U. S. senator. From 1823 to 1827 he was governor of the state, and in 1829 was a second time elected to the U. S. senate, from which he retired before the expiration of his term on account of ill health. He was a man of great integrity, an impassioned speaker, and one of the most earnest and able of the advocates of state rights and state sovereignty.

TROUT, a name popularly restricted to the species of the salmon family inhabiting exclusively or principally fresh water, and embracing members of the three sub-genera of the old genus *salmo* made by Valenciennes, viz., *salmo*, *fario*, and *salar;* the family characters have been given under SALMON. The salmon trouts belong to the genus *fario* (Val.), having one row of teeth on the vomer, the true salmons having the palate smooth; the species are so called from the redness of the flesh, but all the trouts have this color at some epoch of their lives, depending probably on their food. The salmon trout of Europe (*F. argenteus*, Val.; *salmo trutta*, Linn.), called also white or sea trout, is found in the great lakes and rivers of that continent, many of which communicate with the sea; it varies considerably in color, like all of the family, according to the character of the water and the quality of the food; it is greenish gray or bluish black above, lighter on the sides, and silvery white below, with a few black spots above the lateral line; it attains a length of 2 to 2½ feet, and, being abundant in the markets of London and Paris, is next in value to the salmon, which it resembles in habits. Another very large and excellent species is the *F. Lemanus* (Val.), attaining a weight of over 30 lbs.; they are kept in private running waters, but require a large supply of small fishes for food; they ascend the streams from the lake of Geneva as the salmon does from the sea; they are easily and successfully transported to stock other lakes. The so called sea trout of the gulf of St. Lawrence (*salmo immaculatus*, H. R. Storer) has the flesh of a fine pink color and superior flavor; the color is sea-green above, lower parts and the fins white; it rarely exceeds a weight of 7 lbs.; it probably belongs to the genus *fario*. This species, often called salmon trout, affords in spring and summer excellent sport with a brilliant scarlet and gold fly, either from a stationary point, or from a boat under easy sail, with about 30 yards of line out and at least 70 more on the reel. There are several other species called salmon trout in lakes shut off from the sea and near the mouths of the rivers of Maine. The red-bellied trout (*F. erythrogaster*, Val.), of the lakes of New York and Pennsylvania, attains a length of 2 to 2½ feet; it is deep greenish on the back, lighter on the sides and below, the sides with red spots, and the abdomen orange red. The spots of trout resist the action of heat and even of alcohol for a long time.—The common brook or speckled trout of North America (*salmo fontinalis*, Mitch.) is from 8 to 20 inches long, pale brownish above with darker reticulated markings; sides lighter, with numerous circular yellow spots, many with a bright red spot in the centre; white or yellowish white below; the first ray of pectorals, ventrals, and anal edged with white and black, with the rest of these fins reddish. It is found abundantly in the streams of the British provinces, the New England, middle, and western states, and is everywhere highly esteemed as food; it is rarely taken weighing more than 1½ lbs.; the markings vary considerably according to locality and season; in New Brunswick and Nova Scotia it descends to the sea when it can; it is the same species from Labrador to Pennsylvania and Ohio. It is a great favorite with anglers, and its capture leads the lover of nature amid the most romantic scenery and at the finest season of the year; it is taken by the hook and line baited with a minnow, shrimp, worm, or artificial fly; in narrow streams, just before the spawning season, when it is little inclined to bite, it may be caught by titillation, by passing the hand carefully under the tail, and, as the tickling is gently performed, slowly moving it toward the head, until by a sudden grasp it is seized and landed; it is also sometimes meanly taken in the spawning season by a large hook fastened to the end of a long stick.—In the genus *salmo* belongs also the char of the British and Swiss lakes (*S. umbla*, Linn.), usually 9 to 12 inches long, but sometimes 18 or 20; it is umber-brown above, the sides lighter with numerous red spots, the lower parts and fins reddish orange; it varies like all other trouts, and occasionally attains a larger size than the above; it frequents the deep part of the lakes, feeds chiefly at night, and affords but little sport to the angler; its American representative is the *S. oquassa* (Girard) of the great lakes of Maine. The northern char (*S. salvelinus*, Linn.), from the lakes of Wales, is another smaller species.—In the genus *salar* (Val.) there are 2 rows of teeth on the vomer. The common European brook trout (*salar fario*, Val.) is usually 10 to 14 inches long, though sometimes considerably larger, even to a weight of 15 lbs.; it is shorter and stouter than the salmon, yellowish brown above, passing to yellow on the sides, and silvery below, the back spotted with reddish brown and the sides with bright red; the young are transversely banded; deformed specimens are frequently seen. The colors are brightest in rapid streams with rocky or gravelly bottom; the flavor of the flesh is finest from the end of May to the end of September, soon after which the spawning season begins. This species is highly prized by anglers, and especially fly-fishers; the caution with which it takes the bait, and its strength and activity when hooked, test the patience and skill of the angler in no small degree; being fond of swiftly running waters, and swimming almost always against the current, the bait must be thrown up stream; it darts with great impetuosity at real or artificial flies; the experienced fisherman knows where to cast his line in deep holes under banks, where it likes to remain quiet and concealed. The eggs are deposited in nests or holes in the sand, as in the salmon. Several allied species are found in the mountain streams and lakes of central and northern Europe. The great gray trout (*S. ferox*, Val.) is of much larger size, but of inferior flavor; it inhabits the deepest lakes; it is purplish brown above, fading to light gray on the sides, and orange yellow below, with a few spots above the lateral line; the flesh is coarse and indifferent, and of an orange yellow color; the females are dark gray above; it attains a length of 2 to 3 feet, and a weight of 20 lbs. and more. The gray trout of the North American great lakes, from the northern United States to the Arctic ocean, is the *S. namaycush* (Val.), and the *salmo amethystus* of Mitchill and De Kay; it is called togue by the Canadian lumbermen, and from its size and voracity the tyrant of the lakes; it is greenish ashy above with yellowish gray spots, and below white with bluish reflections; the average weight is 12 to 20 lbs., though it attains sometimes more than twice this size. The siskiwit trout (*S. siscowet*, Ag.) belongs to the genus *salar* (Val.); it is of large size, stout and thick, of a rich flavor, but so fat as to be almost unfit for food; for description and figure see Agassiz's "Lake Superior," p. 333 (8vo., Boston, 1850).—The trout, both in Europe and America, is a favorite subject for pisciculture, from the ease with which artificial fecundation of the eggs can be effected; but it has as yet been practised here on a very small scale only; the labor and expense attending a large vivarium of trout are very small, while the remuneration may be made very large.—The reader is referred to Sir Humphry Davy's "Salmonia" for a sportsman's account of scientific fly-fishing for trout.

TROVER (Fr. *trouver*, to find), the name of an action at law in common use in England and in the United States, to determine the ownership of property. The plaintiff declares, in substance, that he was lawfully possessed of a certain article on a certain day, and lost the same; that it came into the possession of the defendant by finding; and that the defendant has refused to deliver it to the plaintiff, and has converted it to his own use. This action is one form of trespass on the case. (See Trespass.) In the distant age when it was first used, the declaration may have narrated accurately the facts of the case; but for a long time the losing and finding have been regarded as mere legal fictions, which the defendant is not at liberty to deny. The action is maintainable: 1, where the property in question is a personal chattel; 2, where the plaintiff had a general or special property in the thing with a right of possession; 3, where the defendant has wrongfully converted the thing to his own use, which conversion may be proved by his wrongful taking of it, or his wrongful detention of it, or his wrongful use or misuse of it. The action demands not the thing itself, but damages for the wrongful conversion; and if the plaintiff recovers, the damages should be measured by the value of the thing at the time of the conversion, with interest, and the judgment is for these damages and costs. If the defendant prevails, the judgment is for his costs.

TROWBRIDGE, Edmund, an American judge, born in Newton, Mass., in 1709, died in Cambridge, Mass., in 1793. He was graduated at Harvard college in 1728, studied law, and rose to great distinction in his profession. In 1749 he was appointed attorney-general, and in 1767 a justice of the supreme court, in which capacity he presided at the trial of Capt. Preston, who commanded the British troops engaged in the "Boston massacre," March 5, 1770. Two years later he left the bench, and until the close of his life lived in retirement. He had the reputation of being the most profound lawyer of his time in New England, and after his retirement occupied himself chiefly in writing essays upon difficult questions of law.

TROY, a city of New York, capital of Rensselaer co., on the E. bank of the Hudson river, at the head of sloop navigation, and also at the head of tide water, in lat. 42° 44′ N., long. 73° 40′ W., 151 m. N. from New York city, and 6 m. N. from Albany; pop. in 1840, 19,334; in 1850, 28,785; in 1860, 39,235. The surface of the city comprises the alluvial flats ¼ of a mile wide on the river, and the hills on the E. known as Mt. Ida. Wynant's Kill on the S., and Poesten Kill at the middle of the city, break through these hills in narrow ravines, and in a series of cascades, the former furnishing 12 mill sites with 2,000 horse power, the latter 10 sites with 1,000 horse power; while the state dam across the Hudson, at the N. part of the city, furnishes 4,000 horse power. Beside these, there is an immense amount of steam power in use. Meadow creek now forms the Hoosic street sewer; and the pure water with which the city is supplied by the Troy water works, is drawn from Piscawin creek into reservoirs which are sufficiently high to carry the water to the top of most of the houses. Protection against fire is afforded by a number of hand fire engines, hose carts, and hook and ladder apparatus, and by 3 first class steam fire engines of great power and capacity. Troy is situated at the principal outlet of the Erie and Champlain canals; and it is connected with Lake Champlain and the north by the Saratoga and Whitehall, Rensselaer and Saratoga, and Troy and Boston railroads, the last named connecting it with the east also; with the west by the New York central railroad; with the south by the Hudson river railroad; and with the east by the western railroad. In the centre of the city is the union railroad depot, built in 1853–'4, one of the largest structures of the kind in the United States, it being 404 by 240 feet, with walls at the sides 27 feet high supporting the roof in a single arch, and a tower 115 feet high. All the railroad lines centre at this depot, and 60 trains arrive at or depart from it daily. The river is spanned by a bridge 1,600 feet long, which is provided with two carriage ways, a railway, and a walk for foot passengers.—The iron manufactures of Troy are of great and increasing importance, and by means of these alone the city has become a controlling point in the iron interest on this side of the Alleghany mountains, and already bears a relation to the country east of those mountains similar to that which Pittsburg bears to the country west of them. Here are easily, speedily, and cheaply brought the rich magnetic ores of Lake Champlain, and the hematitic ores of the eastern counties of New York and the western counties of Massachusetts, which latter ores possess properties for producing the most superior quality of iron made in the country. The anthracite coal of Pennsylvania is deliverable here by the way of the Delaware and Hudson canal and the Hudson river from Rondout, while the bituminous coals are brought from the Cumberland region in large class sailing vessels, and from Blossburg by rail to Corning, and thence by the Erie canal. Among the largest manufacturing establishments of the country are the Rensselaer iron company, producing rails and merchant iron; the Troy iron and nail factory, producing merchant iron, railway spikes, horse shoes, &c.; and the Albany iron works, situated here, producing merchant iron, nails, railway spikes and chairs, locomotive tires, axles, plates, &c. These establishments consume annually about 75,000 tons of coal and 50,000 tons of iron, employ 1,700 hands, and turn out annually $3,000,000 worth of goods. The value of the other iron manufactures of the city, carried on by more than 30 firms, and consisting of stoves, hollow ware, hot air furnaces, machinery, steam engines, scythes, shovels, malleable iron, safes, butts, hinges, steel springs, agricultural implements, &c., is of about the same amount. The Troy coach and car factory employs from 200 to 300 workmen, who make from $300,000 to $400,000 worth of railroad cars, omnibuses, coaches, &c., annually, which are sent to nearly all parts of the United States, as well as to Cuba and South America. The annual product of the shirt and collar business is $1,000,000, requiring the labor of 4,500 persons; of flour and grist mills, $2,000,000; of cotton and woollen mills, $500,000; of breweries and distilleries, $700,000; of the lumber trade, $4,000,000; of miscellaneous manufactures, including clothing, paper and paper hangings, tanneries, boots and shoes, pattern making, carving, &c., $3,000,000. The state census of 1855 placed the annual product, exclusive of the lumber trade, at $8,111,847, and the hands employed at 7,469. A careful examination in 1856 showed the annual product, exclusive of the lumber trade, to be $10,103,000, and the hands 10,032. At the present time the annual product, including the lumber trade, amounts to about $17,200,000, consummated by the labor of about 12,000 hands. The most extensive mathematical instrument establishment in the United States is in this city, as is also one of the largest of the few American globe manufactories. The amount of the banking capital of Troy is $3,008,500. The Troy savings bank, established April 23, 1823, is the third savings bank incorporated in the state. The amount of property which reached tide water at Troy by the Erie and Champlain canals in 1860 was 695,730 tons, valued at $17,048,330; of which 332,466 tons, valued at $3,311,529, were products of the forest; 446 tons, at $126,223, of animals; 189,477 tons, at $7,323,502, of agriculture; 20,289 tons, at $823,644, of manufactures; 4,515 tons, at $1,793,587, of merchandise; 148,537 tons, at $3,664,845, of other articles.—The churches of the city are 33, viz.: 3 Baptist, 1 Congregational, 1 Disciples', 4 Episcopal, 1 Friends', 1 German mission, 1 Jewish, 7 Methodist, 2 Wesleyan Methodist, 5 Presbyterian, 2 Associate Presbyterian, 3 Roman Catholic, 1 Unitarian, and 1 Universalist. The city is divided into 10 wards, each of which elects 2 aldermen, who, with the mayor and recorder, form the common council. The common schools are under the charge of 2 commissioners from each ward. The number of schools is 28, of teachers 104, and of pupils 7,946; the cost of instruction per annum is $39,071.75. The Troy young men's association for mutual improvement (the second institution of the kind established in the state) has a valuable library of 14,000 volumes, and a reading room provided with 70 newspapers and periodicals, and maintains a course of lectures in the winter. It occupies a part of the beautiful freestone building on First street, known as the Athenæum, in which building the post office, city offices, and 2 banks are also accommodated. The Troy female seminary, situated on Second street, fronting Park place, was founded at Middlebury, Vt., and was removed to Troy in 1821. It has gained a national reputation under the charge of its founder, Mrs. Emma Willard. The Rensselaer polytechnic institute, endowed by Stephen Van Rensselaer, was organized in 1824, for the purpose of teaching the application of mathematics to civil engineering and the natural sciences, and has in its special departments a reputation second only to that of West Point. It has 100 students and 14 teachers. The Troy university, opened in 1858, occupies a commanding position on Mt. Ida, is 259 by 58 feet, and 4 stories high, is built in the Byzantine style, and can accommodate 150 pupils. Other institutions of note are the Marshall infirmary, incorporated in 1851, founded by Benjamin Marshall; the Troy orphan asylum, incorporated April 10, 1835, supported by donations and state appropriations; St. Joseph's academy, which is a free school; St. Mary's orphan asylum, the Troy hospital, and St. Peter's college, all under the charge of the Roman Catholics; and the Warren free institute, a school for indigent female children. The total valuation of property in Troy in 1861 was $13,079,680, of which $8,162,500 was real estate, and $4,917,180 personal property.—The first house of any note on the site of Troy was built by Matthias Vanderheyden in 1752, and is still standing on the S. E. corner of River and Division streets. The dwelling of Jacob I. Vanderheyden, built in 1767, is also standing in the northern part of the city. Between 1786 and 1790 the tract was surveyed and laid out, with streets running at right angles excepting where such plan was interfered with by the course of the river. Hitherto the place had been variously known as Vanderheyden's ferry, Ferry hook, and Ashley's ferry; but on Jan. 5, 1789, the name Troy was adopted at a meeting of the freeholders. At this time the place contained 5 small stores and about a dozen dwellings. Troy was formed as a town, March 18, 1791, and the first village charter was adopted in the same year. This was superseded by another on Feb. 16, 1798, and the village was formally incorporated by state acts passed April 2, 1801, and April 9, 1805. The city charter was granted April 12, 1816. On June 20, 1820, a fire took place which destroyed property valued at $490,000, including 93 buildings situated in the thickly populated and business portion of the city. Another fire on Aug. 25, 1854, destroyed property valued at $1,000,000, including 300 buildings. On May 10, 1862, a conflagration destroyed property valued at $3,000,000, including 671 buildings, among which was the union railroad depot, the second Presbyterian, United Presbyterian, and North Baptist churches, the free chapel, the Troy orphan asylum, the Warren free institute, the church asylum, the Rensselaer polytechnic institute, the Troy academy, the Troy city bank, the Union house, Washington hall, and the Fulton house. The fire took on the bridge which crosses the Hudson, one half of which was burned, including the draw. Seven lives were lost.

TROY (Troja), the name of a district in the N. W. part of Mysia in Asia Minor, and of a city situated in it. The latter was also called Ilium, and the former Troas, now the Troad. According to the account of Homer, the city was situated on ground rising above the plain formed by the rivers Scamander and Simois. On the S. E. was a hill, which was a spur of Mt. Ida, and on which were the acropolis of the Trojans called Pergamum, the palaces of the king, and the temples of the gods. No such city as Troy and no such people as the Trojans were known in historic times; but a region called Troas was spoken of by Herodotus and Thucydides, comprising the territory "westward of an imaginary line, drawn from the N. E. corner of the Adramyttian gulf to the Propontis at Parium." There have been various opinions respecting the site of the ancient city, and many efforts made to reconcile the present topography with the geographical statements made in the Homeric poems and other ancient writings, but thus far with but little success. The modern river Mendere, which rises near the summit of Mt. Ida, and runs 40 m. N. W. into the Hellespont, is generally thought to be the Scamander. In the plain its width is from 200 to 300 feet, and it is by far the most important stream in the Troad. The next in size is the Dombrek, which is only 12 m. in length, and is considered to be the same as the Simois. These streams formed a junction in the time of Homer, but now enter the Hellespont by different channels. The Ilium of history was founded, according to Strabo, about the beginning of the 7th century B. C., and was inhabited by Æolic Greeks, but, in spite of the reputation of occupying the site of the ancient city, did not become a place of importance until the arrival of the Romans in Asia. They largely augmented its dignity and power, on the supposition that it was the parent of their own city. Demetrius of Scepsis and Hestiæa took the ground that the Homeric Ilium did not occupy the ground of the more modern city, but was situated about 4 m. further from it in the direction of Mt. Ida, and at a greater distance from the sea. Although no vestige of the "village of the Ilians" existed, this supposition was adopted by Strabo, and has been admitted without any proof by most modern writers. With the exception of the 3 authors above mentioned, all antiquity seemed to recognize in the site of Ilium the place on which "holy Troy" had once stood, and probably it was the place which Homer had in view. The legend connected with the city was the most wide-spread, the most celebrated, and the most interesting of the Grecian legends, and the only one which represented all Greece as bound together in the unity of a common interest.—Dardanus was the mythical ancestor of the Trojan kings. His son was Erichthonius, who was succeeded by Tros, and he by Ilus, who founded in the plain of Troy the city of Ilium. Ilus was succeeded by Laomedon, and to him Neptune and Apollo became temporarily subject by command of Jupiter. The former built the walls of the city, and the latter took care of the herds; but when their time of service had expired, Laomedon treacherously refused to pay what was due them. In revenge Neptune sent a sea monster to kill the Trojans and ravage their fields, and the treacherous king in consequence made a public offer of the immortal horses given by Jupiter to Tros to any one who could rid the land of the monster. But the oracle declared that a virgin of noble blood must be given up, and the lot fell on Hesione, Laomedon's own daughter. She was rescued however by Hercules, who came at this time and killed the monster. Laomedon gave the hero mortal horses, and the latter, indignant at this perfidy, collected 6 ships, attacked and captured Troy, killed Laomedon, and placed on the throne Priam, who alone of Laomedon's sons had remonstrated against the perfidy of his father. To him were born by his wife Hecuba numerous children, one of whom, Paris, brought on by his abduction of Helen, the wife of Menelaus, the memorable siege of Troy. (See Paris.) To revenge this outrage, the Greeks spent 10 years in the collection of a vast armament, and at the end of that time a fleet of 1,186 ships, containing more than 100,000 men, was assembled at Aulis in Bœotia, and placed under the command of Agamemnon. The Trojans and their allies were driven within the walls of their city, and 9 years were spent by the Grecian host in the reduction of the neighboring towns. But the gods now brought on the quarrel between Agamemnon and Achilles, which proved so disastrous to the Greeks, and which forms the subject of the Iliad. The Trojans under Hector forced the besiegers to their ships, and killed Patroclus, the intimate friend of Achilles. His death roused Achilles from inactivity, and he once more entered the fight, drove the Trojans within their walls, and killed their bravest leader, Hector. Later legends recount that after his death the inhabitants of the city were encouraged by the arrival of Penthesileia, the beautiful queen of the Amazons, under whom they were for a time successful, but she was also slain by Achilles. Memnon next came to the aid of the Trojans, with a band of Ethiopians, and under his lead the Greeks were again driven back. A long and doubtful combat ensued between him and Achilles, but at last the Greek champion triumphed. His own time, however, was near at hand; he was slain, according to non-Homeric tradition, at the Scæan gate by an arrow from the quiver of Paris. Philoctetes and Neoptolemus, the sons of Achilles, were summoned to the aid of the besieging army; and at length, by the stratagem of a wooden horse filled with men, which the Trojans incautiously drew into the city, Ilium was taken. Troy was utterly destroyed, Æneas and Antenor alone being suffered to escape with their families.—The legend of Troy was universally believed by the ancients; and the credibility to be attached to it or to any part of it has been the subject of fierce disputes among modern writers. Toward the end of the last century Le Chevalier published an account of the plain of Troy, in which he professed to have found the site of the ancient city, and a controversy sprang up in consequence between Bryant and Morritt, Gilbert Wakefield, and others. Bryant contended that there was no such city as Troy, and no such war as the Trojan; while his opponents held that a basis of truth is not to be rejected because a superstructure of fiction has been erected upon it, and that the universal belief of antiquity was a proof that there was such a war.

TROY WEIGHT, a scale of weights used in England and the United States for weighing gold, silver, and jewels, and in trying the strength of spirituous liquors, and legally established in both for determining the weight of coins. By some, the name of troy weight is supposed to be derived from Troyes in France, the weight being brought thither from Cairo during the crusades, and thence taken to England by the goldsmiths. Others derive the name from Troy Novant, an ancient designation of London; and others from *trois*, three, with reference to the three principal divisions of penny, shilling, and pound, or penny, ounce, and pound, used in money weight. In 1828 a standard troy pound in brass brought from England was declared by act of congress the legal standard of the U. S. mint. According to Hassler, it is equal in weight to 22.794377 cubic inches of distilled water. It contains 5,760 grains, of which 24 make 1 pennyweight, 20 pennyweights an ounce, and 12 ounces a pound. The weight of this compared with the avoirdupois pound is as 5,760 to 7,000, or as 144 to 175. (See Avoirdupois.) It is identical with the pound of apothecary's weight, and the ounce and grain of these two weights are also correspondingly the same. The pennyweight subdivision of troy weight, determining the weight of the silver penny, was established in 1256, as equal to the weight of 32 grains of wheat taken from the middle of the ear. As the kings of later times found it expedient to reduce the value of the penny, this reduction was accompanied by a proportional diminution in the number of grains of which it was composed. A troy weight was established in 1618 by James VI. of Scotland, the pound of which weighed 1.323 pounds troy. This is now abolished by law.

TROYES (anc. *Civitas Tricassium*), a town of France, capital of the department of Aube, situated on the left bank of the Seine, 90 m. E. S. E. from Paris; pop. in 1856, 30,966. The houses have a very antiquated appearance, many of them being made of timber and plaster; but in some quarters these have been replaced by modern buildings. The cathedral, commenced in the 13th century and finished in the 16th, is a fine specimen of the florid Gothic style, with stained glass windows of great beauty. There are several other churches, some of which are very richly decorated. There is a public library containing 55,000 volumes and 5,000 MSS., and numerous schools and scientific and literary societies. Woollen and cotton goods, leather, paper, oil, and wax are manufactured, and there are extensive breweries. Troyes is connected with Paris by railroad.—The town was founded during the occupation of Gaul by the Romans, and in 889 it was burned by the Normans. In 1415 the duke of Burgundy captured it; and 5 years afterward Henry V. of England was married at Troyes to Catharine of France. In 1429 the French, headed by Joan of Arc, expelled the English. In the middle ages great fairs were held here, and the weight called troy, according to some, takes its name from this town. During the last struggles of Napoleon in 1814 his head-quarters were fixed at Troyes, and the town was twice captured by the allies, being once recaptured by the French.

TRUCE OF GOD (Lat. *Treuga Dei* or *Trewa Dei*, from Ger. *Treue*, faith), an institution of the middle ages, designed to mitigate the violence of private war by prohibiting engagement in hostilities, at least on the holy days, from Thursday evening to Sunday evening of each week, also during the entire season of Advent and Lent, and on certain festival days. The days of the week were selected because they were supposed to be rendered holy by the death and resurrection of our Lord. It was an effort made by the church to render less injurious the effects of an evil which it could not wholly root out. This salutary regulation was introduced in the first part of the 11th century, after the great famine of 1028–'30, by the bishops of Aquitaine, who proclaimed a universal peace. But as, on account of the martial spirit of the people, it was found impossible to enforce this, they were obliged to limit it to certain days, and thus arose the truce of God in its peculiar sense. The regulation soon spread over all France; and according to its terms, all unarmed persons, such as priests, monks, nuns, merchants, women, pilgrims, and cultivators of the soil, enjoyed an undisturbed peace. In 1041 the Aquitanian bishops ordered that no private feuds should be prosecuted from sunset on Wednesday to sunrise on Monday of the following week. This was extended by the council of Clermont to the time from Advent to Epiphany, from Lent to 8 days after Pentecost (Whitsuntide), and not long afterward to the days on which were celebrated the feasts of the Blessed Virgin, of John the Baptist, of the Apostles Peter and Paul, and of All Saints, and the eves of those days. Calixtus II., at the council of Rheims in 1136, renewed in the strongest language the truce of God, commanding war to cease on the above mentioned times throughout Christendom, and all violators were to be excommunicated every Sunday in every parish church, and, unless satisfaction were given either by themselves or by their children, were to be deemed unworthy of Christian burial. Yet in spite of these stern penalties, there is no doubt that the regulation was often violated, and the records of the councils and the chronicles of convents record many such cases. It was however extended over all the dioceses and provinces in England, France, Italy, and Germany. Wednesday was not usually included. When the states of Europe began to assume a more consolidated form, and violations of peace and order came under the control of the civil authority, the truce of God disappeared.

TRUFFLE, a subterranean fungus, of which there are many kinds, some of which are in great request for seasoning food. The ancients seem to have been familiar with truffles, and they are described under the name of *ὕδνον* by Theophrastus. The common truffle (*tuber cibarium*, Sibthorp) is of an irregular globular form, having a hard black or dark brown cracked rind, roughened into protuberances; within, its texture is netted or veiny with white and dark lines so as to present a marbled appearance, or else a mottled one like the nutmeg. Neither root, stem, nor other appendage is to be seen in the mature truffle, but it lies in the cavity which it forms in the earth by the increasing lateral pressure of its growth, varying in size from that of a bean to that of a walnut or Madeira nut, and found 10 to 12 inches below the surface. The veiny lines of the interior constitute the hymenium, and by confluence furnish irregularly distributed hollows (*asci*), in which the seed-like bodies (spores), covered by a cellular envelope (epispore), are lodged. This structure is however only a modification of one belonging to a large family of fungi, conspicuous for the evolution of its organs of fructification and its hymenium which accompanies them being plainly exposed to view, and therefore by contrast rendering the hypogæous or underground truffles (*tuberaceæ*) strikingly peculiar. The flesh of the truffle is solid, somewhat juicy, and when ripe of a sharp fragrant odor, different species however possessing different flavors of taste and smell. A moist, light, vegetable mould, in young woods or under the shade of large solitary trees, especially of beech and oak, is favorable to their growth, but the subsoil should be calcareous. The species have been found in various parts of the world, and in certain districts of Europe they especially abound; but in the United States they occur but rarely. Such is the esteem in which they are held, that dogs are trained to hunt for them and dig them out of the ground, and many persons employ themselves in the pursuit as a regular occupation. When the air is moist, and just before a thunder shower, they are said to emit a peculiar odor which facilitates the search. The species mostly sold in the English market is the *tuber æstivum;* but in France higher and more delicious-flavored species, such as the *T. magnatum* and *melanosporum*, are commonly consumed. Several species of insects greedily feed upon them. The white truffle (*rhizopogon albus*, Bulliard) is round, rather rough, at first white, then reddish brown, and slightly fibrillose at base, from which circumstance it is called rootbeard by some writers. It grows in woods in sandy soils, raising itself partially above the surface, in which it differs from the truffle, which is wholly concealed. Schweinitz gives 3 species observed in Pennsylvania and North Carolina, and mentions the frequent occurrence of the common truffle in the former state.—The artificial culture of truffles is not so easy as that of mushrooms; and great care is requisite to fit the soil for even successful transplanting. In countries where they are indigenous, as in the calcareous districts of France, the simple enclosure of a piece of ground and planting it with young oaks will encourage their appearance after a few years.—The *tuberaceæ*, of which the truffle is the type, as subjects for investigation, present unusual attractions to the student in structural botany, and in the employment of the microscope.

TRUMBULL, a N. E. co. of Ohio, bordering on Pennsylvania, intersected by Grand and Mahoning rivers; area, 625 sq. m.; pop. in 1860, 30,656. The surface is undulating and well timbered, and the soil fertile and adapted to dairy farming. The productions in 1850 were 121,068 bushels of wheat, 302,906 of Indian corn, 235,048 of oats, 64,116 tons of hay, 4,352,942 lbs. of cheese, 710,113 of butter, and 208,055 of wool. There were 16 grist mills, 44 saw mills, 4 founderies, 5 woollen factories, 10 tanneries, 73 churches, 3 newspaper offices, and 14,904 pupils attending public schools. It is intersected by the Cleveland and Mahoning railroad and the Pennsylvania and Ohio canal, and Pymatuning swamp occupies part of the county. Capital, Warren.

TRUMBULL, Benjamin, D.D., an American clergyman and historian, born in Hebron, Conn., Dec. 19, 1735, died in North Haven, Conn., Feb. 2, 1820. He was graduated at Yale college in 1759, was employed for some time as a teacher in Dr. Wheelock's Indian charity school in Lebanon, and in 1760 became pastor of the Congregational church at North Haven, Conn. He took an active part in the war of the revolution, not only serving as a chaplain, but volunteering as a soldier. After the war, a large tract of land, known as the "Susquehanna purchase," was claimed by both Connecticut and Pennsylvania; and the conflicting claims occasioned no small disquietude. Mr. Trumbull published a pamphlet on the subject which is said to have been chiefly instrumental in leading congress to acknowledge the claim of Connecticut. He possessed great physical as well as mental vigor, and until he had reached his 85th year his power of endurance had scarcely begun to wane. Beside about a dozen occasional sermons and several controversial pamphlets, he published 12 "Discourses on the Divine Origin of the Scriptures," a "History of Connecticut" (2 vols. 8vo., 1797 and 1818), and a "History of the United States" (8vo., 1810). He bequeathed his MSS. to the library of Yale college.

TRUMBULL, John, LL.D., an American poet, born in Watertown, Conn., April 24, 1750, died in Detroit, May 12, 1831. He passed satisfactorily an examination for admission into Yale college at the age of 7 years, though he did not actually enter it until 6 years later, studying in the mean time the English classics. He was graduated in 1767, and became a tutor in 1771, together with Timothy Dwight, his fellow student, with whom he was associated in writing for the newspapers. In 1773 he was admitted to the bar in Connecticut, but continued the study of law in the office of John Adams at Boston. At the end of 1774 he returned to New Haven, where he remained until 1781, when he took up his residence at Hartford, and there became distinguished in his profession. He was a member of the state legislature, and from 1801 to 1819 a judge of the superior court of the state. In 1825 he removed to Detroit, where the rest of his life was spent. Of his "Poetical Works" (2 vols., Hartford, 1820), the revolutionary satire "McFingal" only is now quoted. This humorous epic, professedly on the model of Hudibras, was so popular upon its original publication that over 30 unauthorized editions of it were sold. It gives a general account of the revolutionary contest in burlesque, with particular descriptions of characters and manners, and satirical sketches of the follies and extravagances on both sides. His principal other poem is "The Progress of Dullness," in 3 parts, the first of which was published in 1772, and the 2d and 3d in 1773.

TRUMBULL. I. Jonathan, an American colonial governor, born in Lebanon, Conn., in 1710, died Aug. 17, 1785. He was graduated at Harvard college in 1727, subsequently devoted himself to mercantile pursuits, and in 1766, having previously been for many years a member of the Connecticut assembly, was elected lieutenant-governor. He early espoused the popular cause, and, having refused in 1768 to take the oath of office enjoined by parliament, was in 1769 chosen governor, to which office he was reëlected for 14 consecutive years. He was a man of great integrity, and coöperated with vigor in securing the independence of the colonies. Washington relied on him, says Sparks, "as one of his main pillars of support," and was accustomed to consult him in emergencies. The generic name humorously applied to the United States is said to have had its origin in a phrase sometimes used by Washington: "Let us hear what brother Jonathan says." A memoir of him has been published by Isaac Stuart. II. JONATHAN, son of the preceding, born in Lebanon, Conn., March 26, 1740, died Aug. 7, 1809. He was graduated at Harvard college in 1759, and at the outbreak of the revolution received from congress the appointment of paymaster to the northern department of the army, which he held until the close of the campaign of 1778, when he entered the military family of Washington as secretary and first aide-de-camp. He enjoyed in this capacity the confidence and esteem of the commander-in-chief, with whom he remained until the close of the war. He was elected a member of congress in 1789, and presided as speaker over the 2d congress, 1791–'3. In 1795 he was transferred to the U. S. senate, and in 1796 elected lieutenant-governor of Connecticut. Two years later he was made governor of the state, which position he filled until his death. III. JOHN, an American painter, brother of the preceding, born in Lebanon, Conn., June 6, 1756, died in New York, Nov. 10, 1843. He was graduated at Harvard college in 1773, and soon after devoted himself to the study of painting, his natural taste for which was stimulated by the contemplation of the works of Smibert and Copley in Boston. He had finished two original pictures, the "Battle of Cannæ" and the "Judgment of Brutus," when the breaking out of the revolutionary war called him to active duties in the field; and in the spring of 1775 he joined the army of the colonies before Boston in the capacity of adjutant of the 1st Connecticut regiment, being then only 19 years of age. His skill in drawing soon procured him from Washington a commission to prepare a plan of the enemy's works; and in return for the able manner in which he executed this task he was, in Aug. 1775, appointed aide-de-camp to the commander-in-chief, and shortly after brigade major. He accompanied the army to New York, and in June, 1776, departed northward with Gen. Gates, with the rank of colonel and adjutant-general. He held this office under Gates, and subsequently under Arnold, until the spring of 1777, when, taking umbrage at the action of congress with reference to the date of his commission, he left the service, and resumed the study of painting. In May, 1780, he embarked for France, and, proceeding thence to London, was kindly received by Benjamin West, under whose instructions he was making rapid progress in his art, when the excitement occasioned by the execution of Major André led to his arrest and imprisonment. West, who was at that time painter in ordinary to George III. and in friendly relations with the king, interceded in behalf of his pupil, and received the royal assurance "that in the worst possible event of the law his life would be safe." Trumbull, however, suffered a confinement of 8 months, which he employed to advantage in study, and was finally admitted to bail by a special order of the king in council on condition of quitting the kingdom within 30 days, West and Copley becoming his sureties. He returned home in Jan. 1782, but revisited England after the conclusion of peace, and resumed his studies under West. One of his first original works, "Priam receiving the Body of Hector," is now in the possession of the Boston Athenæum. In 1786 he produced his first modern historical work, the "Battle of Bunker Hill," followed soon after by the "Death of Montgomery before Quebec," both of which attracted considerable attention. The first, valuable, as are all Trumbull's historical pictures, for its portraits, is one of the most spirited battle pieces ever painted, and was admirably engraved by J. G. Müller of Stuttgart. The second picture was engraved by the Danish engraver F. Clemens in London, and for both prints Trumbull had numerous subscribers in Europe and America. Finding that these works were not altogether of a character to please the British public, he chose for his next subject the "Sortie of the Garrison from Gibraltar" during the memorable siege by the French and Spanish armies, one of the repetitions of which is now the property of the Boston Athenæum. The finished picture, 6 feet by 9 in dimensions, was exhibited with great success in Spring Garden, London, in 1789, and is widely known through the engraving by Sharp. In the autumn of 1789 he returned to America to procure likenesses of distinguished patriots for a contemplated series of national pictures commemorating the principal events of the revolutionary struggle; and while thus engaged he painted several portraits of Washington, one of which, a full-length figure in uniform, is in the collection of the corporation of New York city. Having accomplished his object, he went in 1794 to England as secretary to Mr. Jay, the American minister; and in Aug. 1796, he was appointed 5th commissioner for the execution of the 7th article of Mr. Jay's treaty of 1794, the duties of which office occupied him until 1804, when he returned to the United States. In 1808 he was again in England, and during an uninterrupted residence there of 7 years executed a number of pictures, which met with indifferent success. After his return to the United States in 1815 he never again quitted the country. In 1817 he was authorized by congress to fill 4 compartments of the rotunda in the new capitol with pictures, each 18 feet by 12, illustrating the history of the nation; and during the next 7 years he was chiefly employed in this undertaking, for which he received the sum of $32,000. These works, representing the "Declaration of Independence," the "Surrender of Burgoyne," the "Surrender of Cornwallis," and the "Resignation of General Washington at Annapolis, Dec. 23, 1783," are executed in the style of West, and, apart from their value as collections of authentic portraits, are considered to have little merit. Subsequently for many years he was employed in finishing his former sketches, and in painting copies of his national pictures on a uniform scale of 6 feet by 9; and finding that neither government nor any individual was likely to purchase the series, he concluded an arrangement with Yale college, by which, in consideration of an annuity of $1,000 for the remainder of his life, the whole collection was transferred to that institution, and deposited in a fire-proof building erected especially for their reception. The "Trumbull gallery," as it is called, beside copies of most of the historical pictures above mentioned, contains the "Battle of Princeton," partly finished, the "Surrender of the Hessians at Trenton," the "Death of Mercer at Princeton," a portrait of Washington painted in 1792 for the city of Charleston, "The Woman taken in Adultery," "Suffer Little Children to Come unto Me," painted during his last residence in England, copies of several works of the old masters, &c.—in all, 57 pictures. It is the largest and most interesting collection extant of the productions of any American painter. With the exception of the interval between 1837 and 1841, he passed the last 27 years of his life in the city of New York, and was the president of the American academy of fine arts from its foundation in 1816 until the formation of the national academy of design in 1825. In this capacity he afforded instructions in painting to numerous pupils.

TRUMPET, a musical wind instrument of brass or other metal, which under one form or another has been known in all ages and among all races having any claim to civilization. The term is so vaguely used that it is sometimes regarded as generic merely, and comprehending the whole family of metallic instruments; but the trumpet, so called in modern use, is generally understood as a tube 8 feet in length, expanding at the end whence the sound issues into a bell-like shape, and doubled up in a parabolic form. It is played through a mouthpiece, and has a natural compass from G below the staff to E above.

TRUMPET, Hearing. See Ear Trumpet.

TRUMPET, Speaking. See Speaking Trumpet.

TRUMPET FISH. See Pipe Fish.

TRUMPET FLOWER, a familiar name of several species of the bignoniads of the natural order of *bignoniaceæ*. They are usually twining or climbing shrubs, with opposite compound leaves, without stipules; flowers with 2-lipped, 5-lobed calyx; tubular or bell-shaped corolla, and 5 unequal stamens, 2 to 4 of which are fertile; 2-celled, many-ovuled ovary, 2-lipped filiform style, and 2 to 4-celled, many-seeded capsule. The tendrilled trumpet flower (*bignonia capreolata*, Linn.) has a high climbing stem, evergreen leaves, the short petiole terminating at the apex of the leaf in a branched tendril, the leaflets ovate, cordate, acuminate, the flowers monopetalous and bell-shaped, with a tube 2 inches long and an outspread divided rim, of a red color without and yellow within. It climbs over trees and shrubs, and is found in the woods from Virginia to Florida, blossoming in April. The name of crosswood is given to this species, on account of the woody portion of its stem being subdivided into 4 cruciform lobes. The hardiest of the trumpet flowers is the *tecoma radicans* (Jussieu), a luxuriant ornamental vine attaching itself firmly to trees, houses, and other structures by means of rootlets which issue from the stems, and climbing to great heights in a single season. Its leaves are pinnate, the leaflets somewhat ribbed, smooth above, pubescent beneath, the flowers in a sort of raceme, large, 2 to 3 inches long, of a scarlet color, but yellowish within, succeeded by very long, terete, silique-like capsules filled with winged seeds. There are some varieties of this species, of which the *T. r.* var. *atropurpurea* is considered the finest, having elegantly winged leaves and conspicuous flowers of an orange-red color tinged with violet purple. The erect trumpet flower (*T. stans*, Juss.) has smooth, pinnate, long-petioled leaves of 7 leaflets, many-flowered racemes, the flowers with tubular calyx, long, yellow corolla, and 5 stamens, the 5th one abortive; it occurs in southern Florida, blooming there from March to May. There are several other species which require artificial heat to perfect them, such as the *bignonia venusta* (Bot. Reg.), a native of South America, and one of the most splendid of hothouse creepers. Its stems are long, slender, dark gray, and pliant; its leaves ternate, but in pairs on the terminal branches, each leaflet being thin, smooth, acuminate-ovate, of a rich green; the flowers in numerous corymbs, of a rich vermilion-orange and trumpet-shaped. It requires continuous gentle heat at its roots, and pruning after the wood has ripened. By allowing it to rest from April to September, its blossoms appear from November to the following spring. The jasmine-scented trumpet flower is the *tecoma jasminioides*, a handsome evergreen climber, well suited to the greenhouse or conservatory, its leaves being bright green with ovate leaflets, its flowers produced on long terminal racemes, funnel-shaped, each 2 inches long, pure white, with a rosy throat; a variety known as the *rosea* is a better bloomer and its throat more deeply tinted. The large-flowered trumpet flower (*T. grandiflora*) is a highly ornamental species; its leaves are deciduous, elegantly winged or pinnate, 12 inches in length; the flower panicles terminal, wide-branching; each flower large, broad-limbed, trumpet-shaped, 3 to 4 inches wide, and of a bright red-orange. Where the climate permits, it becomes magnificent in outdoor culture trained upon a wall.—The bignoniads are readily raised from seeds, layers, and cuttings. Several are employed economically, as the *B. chica*, whose leaves boiled in water give a feculent red substance important to dyers, and imparting an orange-red color to cotton. The tough shoots of *B. chirere* are woven into wickerwork. Several species abound in tannin, and bitter and mucilaginous principles, or possess cathartic and diuretic properties; a Brazilian species is employed in treatment of syphilis; the roots of others are poisonous as well as bitter. Some are large trees, valuable for timber.

TRUMPETER, in ornithology. See Agami.

TRUNK FISH, the very appropriate name of the plectognathous fishes of the genus *ostracion* (Linn.), derived from the bony case in which their soft parts are enclosed; they are also called coffer fishes. The head is prolonged into a snout, at the end of which is the mouth, with fleshy lips, and armed with a series of distinct teeth, 10 or 12 in each jaw, received into sockets, somewhat like the human incisors; body covered by bony plates, large, quadrangular or hexagonal, encasing the animal in an inflexible bony armor; tail enclosed in a bony tube, this and the pectoral fins being the only movable parts; even the vertebræ are usually immovable; eyes large and prominent; dorsal single, far back, small, and entirely soft; pelvic bones and ventrals absent; body 3 or 4 sided, with linear branchial openings, bordered by a fleshy edge within which are the gill covers; they have very little flesh, and some are believed to be poisonous; the stomach is membranous and very large; the liver is also large, often yielding a considerable quantity of oil; some are armed with spines on the head and body; they are generally of small size, and found in the tropics, whence they sometimes wander to temperate zones. There are a few species on the coast of the United States, arranged by De Kay in his genus *lactophrys*, having a triangular body, with strong spines, directed backward, in front of the anal fin, and the orbits usually spinous. The 6-horned trunk fish (*O.* [*L.*] *sex-cornutus*, Mitch.), from the gulf of Mexico, is 7 inches long, with 2 spines on the head and 4 on the abdomen; it is clouded with brown above, and white below. Yale's trunk fish (*O.* [*L.*] *Yalei*, Storer), on the coast of Massachusetts and New York, is 14 inches long, with 2 abdominal spines. The *O. triqueter* (Linn.), or triangular trunk fish, from the West Indies, is 12 inches long, without spines, reddish brown with a white spot in the centre of each hexagonal plate. There are other species in the East Indies.

TRURO, Thomas Wilde, baron, an English statesman and jurist, born July 7, 1782, died at Bowes Manor, Middlesex, Nov. 11, 1855. He was the son of a solicitor in London, and after a preliminary career as an attorney was in 1817 called to the bar, and rose to such eminence in his profession, that in 1820 he was employed as one of the junior counsel for the defence in the trial of Queen Caroline. In 1824 he was made sergeant at law, in 1827 king's sergeant, in 1839 solicitor-general, and in 1841 attorney-general. Upon the return of the whigs to power in 1846, he was appointed chief justice of the court of common pleas, and in 1850 lord chancellor, on which latter occasion he was raised to the peerage as Baron Truro. He retired from office in 1852 on a change of ministry. He was an able, impartial, and industrious judge, and accomplished several much needed reforms in the procedure of the courts of chancery and common law.

TRUSS, a contrivance for preventing the reappearance of a hernial tumor after its reduction. The general form of the truss is a flat steel spring covered with soft leather or oiled silk, and having its ends approximating to within a few inches of each other; attached to one end is a small round or oval pad, stuffed with cotton or wool, and having for its basis a small iron plate; the other end of the spring has either a larger and flat pad, or a strap connected with it. The smaller pad is placed over the ring or point where the hernial tumor has protruded (see Hernia), and the spring passes over the hip, and either exerts its pressure by means of the large counter pad on the back, or is by means of a strap passing over the opposite hip connected with the pad by a buckle or eyelet and button on the back of the pad. Sometimes, where it is necessary to adjust it with great care, another strap passing over the inner surface of the thigh connects with the spring on the back. Where, as is sometimes the case, there is a double hernia, this spring is made sufficiently long to clasp over both hips, and has a pad at each end. In this case there should be a pad attached to the middle of the spring to exert gentle pressure on the spine, and thus keep the truss more perfectly in position. There are numerous patterns of trusses, varying considerably in form; they may all, however, be reduced to 3 classes: those with a flat pad, intended to press upon the whole surface of the ring or place through which the intestine protrudes; the oval or egg-shaped pad, which presses directly into the ring, and thus prevents the escape of the intestine; and the semicircular pad, which acts by supporting the intestine from above and pressing it away from the point of rupture. The truss, though preventing the recurrence of the hernial tumor when properly adjusted, seldom effects a radical cure. This has, however, been attempted, by purposely so adjusting it as to cause it to produce some inflammation and adhesion of the serous surface around the ring so as to produce complete occlusion of it; but it should never be done except under the direction of a skilful physician, as it is attended with danger.

TRUSTS. It is quite certain that trusts, which have now such immense importance in the law and the disposition of property in England and in the United States, originated in fraud. The feudal law of tenures embarrassed owners of property in their disposal of it, and the statutes of mortmain obstructed the appropriation at the pleasure of the owner still more; and it was to evade these rules of law, that trusts (or the granting of property in trust) were invented. As the common law took no cognizance of trusts, they came before a court of equity. And if we remember that the chancellor was in early times usually a priest, and that the statutes of mortmain, which trusts were invented to evade, restricted or prohibited the granting of property to religious communities, we can understand why the court of equity took them under its protection. It did this by summoning the trustee before it, and compelling him "to do what justice and equity required." Hence Sir Robert Atkins, in the reign of Charles II., said: "A trust had for its parents fraud and fear, and for its nurse a court of conscience." The way in which these laws were successfully evaded by trusts was this. If property is given to A. B., with all the forms of law, and in the same manner as if it were to be absolutely his own, but in fact for the use and benefit of C. D., the common law knows no one but A. B.; all the title is in him, and the estate in him is protected against all forfeitures but those which attach to him. But C. D. has all the benefit and advantage of the property. Hence if C. D. were a traitor, who would have forfeited the estate had it been his in law, or a religious body who could not take the estate by law, A. B. still might hold it for the benefit of C. D. In this way fraud and fear were the parents of trusts. But as the law knew no estate or title but that of A. B., if he chose to be dishonest, and to refuse all benefit of the trust to C. D., there was no remedy at law, and the trust would have been defeated. Then the court of equity came in, and, by compelling A. B. to perform the trust he had undertaken, became the nurse of this child of fraud. Now, however, trusts are employed in a vast number of cases, most honestly and beneficially, wherever it is desired to give any person the benefit and use of property, but to keep from him or her all power of forfeiting or alienating it. The greatest number of modern trusts are created either by will or by transfer *inter vivos* to protect the estates of women from the control or the creditors of their husbands, or to carry down property to a series of holders, in some other way than that which would be provided by the laws of inheritance or distribution. To all trusts there are therefore two parties. One of these holds the legal title to the estate, and he is called trustee; the other is the party who has the actual benefit of the trust, and who is called, by a Norman French phrase, the *cestuy que trust*. As the trustee has all the title which a court of law can recognize, he is said to have the legal estate; and as the *cestuy que trust* has an interest which only a court of equity can recognize and protect, he is said to have an equitable estate. At present, however, when the courts of law and the rules of law are coming nearer to the courts and the rules of equity, the antagonism between these has passed away, and the distinction become much less important. There may be any number of trustees and any number of *cestuy que trusts* in any trust. If the trustee holds the property for the benefit of the *cestuy que trust* without any particular restrictions, directions, or provisions, it is called a simple trust; and then the nature and operation of the trust are determined by legal or equitable construction. But if the purposes of the trust, and the manner in which and the means by which these purposes shall be accomplished, are specifically pointed out and defined, it is then a special trust, and these special directions must be accurately complied with. Hence a trust may be merely ministerial; and it is so called when the trustee has no other duty than to collect and pay over the proceeds of property. Or it may be a discretionary trust, and is so when the general purpose only is declared, and the manner in which this purpose shall be accomplished is left to the discretion of the trustee. So a trust may have a power annexed; as when a trustee of lands has the power of leasing, or even of selling and converting them into personal property. And indeed any lawful powers may be given to a trustee. There are also private trustees and public trustees. The former hold property for one or more individuals, who are distinctly pointed out, personally or by description. Public trustees are those who hold property for the benefit of the whole public, or for a certain large part of it, as a county, town, or parish. They are regarded by the law as in many respects official persons, with official rights and responsibilities.—The subject matter of a trust may be any property of a valuable nature, and many things also which the common law does not recognize as disposable or assignable property; as choses in action and probabilities of every description, or mere authorities which may be or become valuable. Even if the property be in another state or country, so that the process of the court could not reach it, yet it is now settled that a court of equity in any of the United States will interfere in any case of trust, however distant or inaccessible the property may be, provided the principal defendants are actually served with process, and adequate relief may be given by a decree *in personam*.—As to the capacity of creating a trust, it may be said that any person who has the power of making a valid disposition of any property, by will or grant, has also the power of attaching to his or her disposition of the property such limitations or directions as shall create a trust, and make the person who takes the legal estate in the property a trustee for the persons to whom the beneficial interest is given. Even if the property is transferred and the trust created by one who does not hold it with a complete power of final disposition, as a married woman or an infant, yet the trust will be valid and protected so far as the subject matter of it is within their power of conveyance.—It may be said, as a general rule, that any person may be a trustee, even if he be incapacitated by law from transacting business on his own account. Thus infants, idiots, lunatics, married women, or other persons *non sui juris*, may become trustees. The reason is, that the trust is created for the benefit of the *cestuy que trust*, and not of the trustee; and if the trustee cannot take the legal estate, there will be nothing to support the equitable estate, and the trust will fail. So, too, it is established doctrine that a trust once created shall never fail on account of the death of a trustee, or his refusal to accept the trust. All difficulties of this kind are avoided by the power of the proper court (usually the court of equity) to remove a trustee and supply his place, or fill the place of a trustee when vacant by his death or refusal. And, in general, it may be said that the appropriate court in England and in the United States has full power to do whatever may be necessary, by way of removal, substitution, or appointment, to sustain and effectuate a trust. It is a very common thing for a will or deed creating a trust to prescribe in what way and by what person or tribunal this power may be exercised; and provisions to this effect would doubtless be regarded when they did not contravene the general principles of the law, or the statutory provisions in behalf of trusts and trustees. It may be added that any person in possession of property, real or personal, by legal title and of his own right, may, by a proper declaration of trust, convert himself into a trustee, and then his legal title will remain undisturbed, but subjected to the equitable interest.—Any person may become a *cestuy que trust* of property, to the extent of his legal capacity of holding the same. Nor is it necessary to the creation of a trust estate, that the *cestuy que trust* should be named, or even that he should be in being when the trust is created. Thus money may be bequeathed or given to a trustee for any children that a certain person may have living at his death, and to accumulate until the death of that person. The assent of the *cestuy que trust*, if he is capable of giving one, is, strictly speaking, necessary; but it will be presumed where the trust is beneficial to him. It is now a common practice to permit societies and institutions to take the benefit of a trust, which are not incorporated and therefore not recognized by the law; but they must be definitely described, and capable of certain identification.—Trusts and uses (see USES) were originally created and declared principally, if not exclusively, by parol; but this was because they were then intended to evade the law. Now, it is uncertain whether trusts, especially trusts of real estate, can be created except in writing, and for some purposes by deed. We should say that most of our courts of equity might recognize and protect trusts created by parol, if they were sufficiently definite and certain as to their terms, and the subject matter and the persons thereof, although created only by parol, and even in some cases where a statutory provision required writing or a deed. In most of the United States, the provisions of the English statute of frauds, requiring trusts to be in writing, have been reënacted. In England, however, courts of equity have given a very liberal construction to these provisions, and a similar construction might be expected here. Where a trust is created, if at all, by a writing, especially if that writing be a will, any direct fiduciary expressions, indicative of a purpose that the donee of the property is to take it, in whole or in part, for the benefit, use, advantage, or support of another, will be held sufficient to create a trust. Seldom are particular words required in equity, and even Lord Eldon has said that the absence of the word "trust" is a circumstance to be attended to, but nothing more. But such words or directions must be imperative on the donee; if they, by fair construction, only give him a power or permission, or even express a desire which is not obligatory on him, they do not create a trust. If however the trust is distinctly and positively created, although no *cestuy que trust* is designated, the courts will enforce the trust, for the benefit of those who may take by disposition of the law. If the donee may at his own discretion or pleasure execute the alleged trust or not, it is not a trust; but it is a valid trust if he must execute the trust, although the manner of doing it is entirely at his discretion. So, too, there may be what are called "resulting" or "presumptive trusts," which are expressed nowhere, but are implied or presumed from the assumed intention of the parties, or arise from the nature of the transaction; and the statute of frauds expressly excepts these trusts from the requirement of writing.—It is sometimes important to determine whether a trustee accepts the trust. He is always at liberty to decline it, but he cannot take the property without the trust. As every trust confers the legal title on the trustee, there is a presumption similar to that already mentioned in reference to the *cestuy que trust*, namely, that it is for his benefit, and therefore his acceptance will be presumed. But the presumption is of much less weight than in the case of the *cestuy que trust*, because if a trustee take the property at all, he takes it *cum onere*, and the burden may be very heavy. Properly, therefore, the best if not the only evidence of an acceptance of the trust is some action by the trustee under it. The same person may stand in different relations; thus he may be appointed executor and also trustee; and he may give separate bonds with different sureties, as executor and as trustee. In such cases it is sometimes difficult to say where the duty and responsibility of executor end and those of trustee begin. The general rule is this: If the executor has specifically set apart a portion of the estate to the purpose of the trust, he will be considered as to that portion as having discharged his duty as executor and entered upon his duty as trustee.—An important doctrine of the law of trusts, familiar to English lawyers and frequently applied in English courts, is known by the name of the *cy-pres* doctrine. This phrase means literally "near to it;" and this doctrine is applied when a trust is certainly created, and it is impossible to execute it precisely as the donor prescribed, and then a court of equity, from its desire to sustain the trust, will direct an exercise of it as near as possible to the original intention of the donor. By far the most frequent occasion for its application arises from the change of circumstances in ancient trusts; as, for example, where there is an endowment for a school limited to scholars of a certain description, and there are not now any scholars of that description. But that necessity cannot exist so frequently or with so much force in the United States as in England. As an undefined judicial power, it is open to abuse, and is, if not denied or disclaimed, exercised with great forbearance in the United States.—Trustees are held, both in England and in this country, to a somewhat strict accountability. A trustee is bound not only to guard against loss or damage to the trust property, but to see that it is made reasonably productive. If he suffers it to lie idle, when safe investments can be made, he will be charged with interest, and in some cases, as when he is guilty of gross delinquency, or if he mingles the property with his own for his own benefit in trade or otherwise, he will be charged with compound interest. He will however be allowed a reasonable time without interest for making his investments, because he is bound to exercise due care in making them; and if he exercises this care, and especially if he follows the directions of a court or of statutes applicable to the case, he will not be liable for whatever loss may occur. He may not himself buy property which he sells as trustee, nor sell his own property and buy it as trustee; and this rule is applied not only to all trustees, but to agents generally.—An important difference between private and public trustees should be mentioned. Private trustees are responsible on the contracts they make as trustees, unless they guard against this by express reservation; and merely calling themselves trustees, or even saying they act as trustees, is not, generally speaking, sufficient. Thus an executor, signing a common promissory note as executor, is still liable on it personally, although the estate be insolvent. But public trustees, or persons acting in a known official capacity, are not personally liable on the contracts they make for the state or government, unless they make themselves so expressly, or by a reasonable implication, or have in their hands funds for the purpose of the contracts. It is, of course, always in the power of one who deals with a public trustee or agent to ask of him his own personal liability; and it is always in the power of that trustee to give it or withhold it.

TRUXILLO, or TRUJILLO (anc. *Turris Julia*), a city of Spain, in Estremadura, province of Caceres, situated on the Tozo, a tributary of the Tagus, 130 m. S. W. from Madrid; pop. 6,026. It consists of three parts, the citadel, old town, and city, which stand respectively on the summit, slope, and at the foot of a hill. The whole place has the appearance of decay, and the upper and more ancient part is now used as a burying ground, the inhabitants having abandoned it. The fortress dates from Roman times. In the lower town there is an extensive square, which contains among other large mansions one belonging to the family of Pizarro, the front being ornamented with numerous bassreliefs representing the conquest of Peru. Francisco Pizarro was a native of this place, as were also many of the adventurers who assisted in the conquest of Peru. Roman antiquities have been discovered in the town and neighborhood.

TRUXILLO, or TRUJILLO, a town of Peru, capital of the department of Libertad, situated 1½ m. from the sea, in the valley of Chimu, lat. 8° 7′ S., long. 79° 9′ W.; pop. about 8,000. It is built upon the side of a mountain, and is surrounded by a mud wall flanked with bastions. There are some good brick houses, which are generally low. It is the see of a bishop, and has a cathedral and several large churches. There is a college, a hospital, and a theatre. Rice and spice are exported from Huanchaco, which is the port of Truxillo, and lies about 8 m. N. W. from it. Truxillo was founded by Pizarro, who named it after his native town in Spain. In the neighborhood there are many ancient Peruvian remains.

TRUXTUN, THOMAS, an American naval officer, born on Long island, Feb. 15, 1755, died in Philadelphia, May 5, 1822. During the revolution he served in privateers and letters of marque as lieutenant and captain, was several times engaged, and made a number of valuable captures. In 1795 he received a commission as captain in the navy. His first service was in the frigate Constellation, of 38 guns. On Feb. 9, 1799, when off the island of Nevis, he fell in with, and captured after a close action of about one hour, the French frigate L'Insurgente, Capt. Barreault. The armament of L'Insurgente consisted of 40 guns with a complement of 409 men. She was much cut up, and lost 29 men killed and 40 wounded. The Constellation sustained but little injury, and had 3 men wounded. On Feb. 1, 1800, the Constellation, still commanded by Truxtun, fell in off Guadeloupe with the French frigate La Vengeance of 54 guns, Capt. Pitot. A long and severe encounter took place, in which both ships were much crippled. La Vengeance escaped, and got into Curaçoa dismasted and in a sinking condition, with a loss of 50 killed and 110 wounded. The loss of the Constellation was 14 killed and 25 wounded. Her mainmast went by the board at the close of the action, which prevented her from pursuing her antagonist. For this action congress awarded Truxtun a gold medal. In 1801 he was transferred to the President, 44, in which ship he hoisted his broad pennant as commodore on the Guadeloupe station. At one time he had a squadron of 10 sail under his command. He resigned his commission in 1802, and afterward filled important civil offices.

TSCHIRNHAUSEN, **Ehrenfried Walter von**, count, a German mathematician and philosopher, born on his father's estate of Kislingswalde in Upper Lusatia, April 10, 1651, died there, Oct. 10, 1708. At 17 he entered the university of Leyden, and in 1672 volunteered in the Dutch army in the war against France. In 1673 he began a journey, in the course of which he visited England, France, and Italy. On returning he gave his attention to the construction of optical instruments, and established glass factories and a mill for the polishing of burning glasses, one of which, weighing 160 pounds and 33 inches in diameter, is now in the cabinet of the academy of sciences at Paris. He also constructed a burning mirror of highly polished copper 5 English feet in diameter, and the focal distance of which was 3.7 feet; it is now in Dresden. Several communications by him upon subjects of this character are to be found in the *Acta Eruditorum*. Tschirnhausen also discovered a method of making porcelain, from which the manufacture of porcelain in Saxony took its rise. In philosophy, he wrote *Medicina Mentis* (Amsterdam, 1687), a kind of companion work to *Medicina Corporis* published by him the year previous. In mathematics, he investigated the properties of the curved line which goes under his name.

TSCHUDI, an ancient and noble family of the canton of Glarus, Switzerland. The ancestor of the house was Johann, who was ennobled by the emperor Louis III. in 906; and from that time many of his descendants have been distinguished in the wars of the crusades, in the wars against Austria, and in the French service. The most celebrated members of the family are the following: I. **Ægidius** (**Gilles**), a Swiss historian, born in the canton of Glarus in 1505, died Feb. 28, 1572. One of his first instructors was the reformer Zwingli; afterward he studied at Basel, Paris, and Vienna. In 1528 he was made ambassador from the canton of Glarus to the assembly of the state which met at Einsiedeln to deliberate in regard to matters connected with the reformation; in 1529 became governor of Sargans; and in 1532 was chosen by the abbot of St. Gall as the manager of several estates belonging to the abbey. In 1533 he was made governor of Baden, and received the same position in 1549 after having been for 8 years in the French service. In 1556 he was stadtholder and in 1557 landamman in Glarus. In 1559 he was sent by the confederation to Augsburg to demand of the emperor Ferdinand I. the confirmation of their rights and privileges. Subsequently, when the strife between the Catholics and Protestants grew fiercer in the canton of Glarus, he strongly supported the side of the former, and in consequence drew upon himself to such an extent the aversion of his countrymen, that after 1562 he resided partly in Rapperschwyl and partly in the convent of Einsiedeln; but in 1564 he returned to Glarus, where he spent the remainder of his life engaged in literary studies and political duties. He was one of the most learned and prolific writers of his time, though only a few of his works have been published. Beside a number of treatises known only by their titles, there are 166 of his works specified as existing either in print or in manuscript, the most celebrated being his chronicle of Swiss history to the year 1570, but which has been printed only as far as 1470 (2 vols., Basel, 1734). This work was written in German, and is regarded by the Swiss historian Johannes von Müller as an original authority. His life has been written by Fuchs, *Aegid Tschudis Leben und Schriften* (2 vols., St. Gall, 1805). II. **Johann Jakob**, a Swiss traveller, naturalist, and ethnologist, born in Glarus, July 25, 1818. He was educated at the gymnasium and the university of Zürich, and continued his studies in natural history in Neufchâtel, and afterward in Leyden, where he published his *System der Batrachier* (1838), and in Paris. From this last named city he set out, in Feb. 1838, on a voyage around the world; but as the vessel was sold to the Peruvian government on reaching that country, his investigations were limited to the study of the natural history and ethnology of Peru. In 1843 he returned to Europe, and, being prevented from taking part in the arctic expedition under command of Capt. Franklin, settled on his estate of Jacobihof near Wiener-Neustadt in Lower Austria. He has published *Peru: Reiseskizzen aus den Jahren* 1838–'42 (2 vols., St. Gall, 1846; translated into English in 1847 by T. Ross); *Untersuchungen über die Fauna Peruana* (St. Gall, 1844–'7); and *Die Ketschuasprache* (2 vols., Vienna, 1853), which contains a grammar and dictionary of the Peruvian language. He has also edited, in conjunction with Don Mariano Eduardo de Rivera, the *Antiguedades Peruanas* (Vienna, 1851; translated by the Rev. F. L. Hawks, 8vo., New York, 1854). III. **Friedrich**, born in 1820, is the author of a celebrated work entitled *Das Thierleben der Alpenwelt* (Leipsic, 1852; 2d ed., 1854).—The history of the family has been written by Blumer under the title of *Das Geschlecht der Tschudi* (St. Gall, 1853).

TSETSE, the native name of a proboscidian dipterous insect of the genus *glossina* (Wiedemann), peculiar to Africa, and especially to the tropical portions. This genus comes near *stomoxys* (Fabr.), and resembles in appearance and habits the gadfly called in Scotland cleg (*hæmatopota pluvialis*, Meig.). The best known species, *G. morsitans* (Westw.), is 5 lines long and 8½ in expanse of wings, a little larger than the house fly; the head is dirty buff, and the eyes large; thorax chestnut red, with 4 longitudinal black bars; abdomen dirty buff, with black bristles above, the first segment with a round black spot at each side, and the 4 following with a broad dark brown band interrupted in the middle; the wings are considerably longer than the body. The blood-sucking apparatus consists of a long horny proboscis, containing a compound bristle or 2 needle-like piercers, communicating with a poison bulb at the base, and supported on each side by 2 feathery palpi. It is very active and difficult to catch, except in the cool of the morning and evening, when it is sluggish; it has a loud and peculiar buzz, which does not terrify cattle like that of the gadflies. This scourge of the African wilderness has no sting in the tail, and deposits no eggs on or under the skin of animals, but introduces its poison into the blood by the proboscis during the act of sucking. The puncture of the tsetse is almost certain death to the ox, horse, sheep, and dog, but is harmless to man, the mule, ass, goat, pig, wild animals, and even calves while sucking; in man it causes a slight itching, like that after the bite of the mosquito or flea. It produces no immediate effect in the ox or horse, but in a few days there appears an exudation for half an inch around the punctures, the eyes and nose begin to run, the skin quivers as if from cold, and swellings occur under the jaw; the animal may continue to graze, but by degrees grows thin and weak; this state may continue for months, until purging comes on, and death ensues from exhaustion. The better the condition of the animal bitten, the more speedy often will the death be, accompanied by symptoms of staggering and blindness, as if the poison affected the brain; sudden changes of temperature hasten the progress of the disease, which, according to Dr. Livingstone, in spite of every care and medical treatment, goes on to certain death. They occasionally attack a horse like a swarm of bees, alighting on him by hundreds, sometimes causing death in a week. After death the subcutaneous areolar tissue is found injected with air, and the fat is oily and greenish yellow; the heart and muscles are very soft and flabby, the gall bladder distended with bile, the blood much reduced in quantity, with signs of disease in the lungs and liver. No remedy is known against the effects of their bite; the natives pretend to have roots which, pounded and sprinkled on the hair, prevent the bite, but their inability to keep cattle proves their inefficacy; the droppings of animals mixed with human milk and drugs, and smeared on the hide, often prove a temporary safeguard; an animal slightly bitten and escaping death will fall a victim to the next severe bite. With the destruction of the game, this insect, deprived of its food, may become extinct; and until it does, whole districts are rendered unable to keep cattle, horses, sheep, or dogs. It is found chiefly in the bush or among reeds, and rarely in the open country; it is confined to limited regions, which it never leaves, so that cattle may graze in quiet on one side of a river while the opposite bank swarms with tsetse. If obliged to pass through a country infested by them, the natives select a moonlight winter night, when they are torpid from cold. The flesh of animals bitten by the tsetse is not unwholesome, if they are killed before emaciation and weakness supervene. According to Westwood ("Proceedings of the Zoological Society of London," No. 217, Dec. 1850), the tsetse is the same as the *zimb* of Bruce (a modern Arabic word), and the *zebub* in Hebrew; the marquis of Spineto ("London and Edinburgh Philosophical Magazine," 1834, vol. iv. p. 170) identifies the zimb with the *κυνομυια* or dog-fly of the Greeks, with the *tsal tsalya kelb* of the Alexandrian church, with the *af an onhor* of the ancient Egyptians, with the *arob* of Exod. viii., the fly which caused the 4th of the plagues of Egypt, and with the *œstrus* of Aristotle (but not of the moderns). In the paper above cited Westwood describes two other new species, the *G. tachinoides*, smaller, and the *G. tabaniformis*, larger than the common species, both from western tropical Africa. Gordon Cumming alludes to, and C. J. Andersson and Dr. Livingstone give an extended account of the ravages of this insect.

TSUS-SIMA, an island of the Japanese empire, lying in the strait of Corea, S. W. of Niphon, in lat. 34° N., long. 129° E. It is 35 m. long and 10 or 12 broad, and is separated by a narrow strait from the island of Fatchin, lying S. W. of it. A chain of high and rugged hills, with deep but fertile valleys, extends through nearly the whole length of the island. It is now an important naval depot of the Russians, who took possession of it in June, 1861, after a bombardment in which a considerable loss was suffered on both sides.

TUAM, a town of Connaught, in the county of Galway, Ireland, on both sides of the Harrow, 19 m. N. N. E. from Galway; pop. in 1851, 7,819. It contains both Protestant and Roman Catholic cathedrals, the Roman Catholic college of St. Jarlath, several public schools, a monastery, and a nunnery. The workhouse and other public institutions in 1851 contained 2,881 inmates. The manufactures are trifling, but there is a considerable trade in grain. Tuam is a place of great antiquity, and had a cathedral founded by St. Jarlath in the 6th century. It is the see of a Roman Catholic archbishop, and was an archiepiscopal see of the established church from the 12th century to 1839, when it was reduced to a bishopric, with Killala and Achonry, suffragan to Armagh.

TUARIKS, or TOUAREGHS, a people supposed to be of the Berber or Amazirgh race, occupying that portion of the great desert of Sahara lying between Morocco and Soodan, and extending westward from Fezzan to the Atlantic. They assert that they came originally from Canaan, and may be the descendants of some of the tribes driven out by the Israelites. They are Caucasian in their features, and, though of dark complexion, have straight hair, and bear no resemblance to any of the negro races. They are tall and handsome, bold, warlike, and predatory, and live chiefly on booty and tribute exacted from their neighbors. They are very zealous Mohammedans, and are governed by independent chiefs. (See AZKAR TUARIK.) The Tibboos, who occupy that portion of the desert lying between Fezzan and Egypt, are considered a branch of the same family with the Tuariks. Baron Aucapitaine (*Nouvelles annales des voyages*, Dec. 1861) estimates the total number of the Tuariks at 192,000.

TUBERCLE. See CONSUMPTION.

TUBERCULAR MENINGITIS. See HYDROCEPHALUS.

TUBEROSE, a fragrant flower of the liliaceous order, called by botanists *polyanthes tuberosa*, blossoming in the autumn. Its native country is unknown; it was first noticed in Europe by Clusius, a Dutch writer of the 16th century, who received it as an Indian plant. The old gardeners designated it as the Indian hyacinth and the *plante tubéreuse*. It is an endogenous perennial, with a thick, fleshy, tuberous root, from the crown of which issues a slender stem about 3 feet high, bearing numerous long, linear lanceolate leaves, and at the summit a spike of conspicuous white flowers, the corolla being monopetalous and funnel-shaped, the tube incurved, the rim outspread and divided into 6 segments, the seed vessel an obtuse, roundish, 3-cornered, 3-celled capsule, filled with half-round seeds arranged in a double row. There are several varieties; the one with double flowers is the most esteemed. The slender tuberose (*P. gracilis*), a native of Brazil, was brought into notice in 1822; its flowers are of a pale yellow, but it is otherwise like the common kind.—The tuberose is usually imported into the United States with flower bulbs from Holland, and the largest and firmest roots, deprived of their offsets, are selected for blooming. They should be potted early in the spring in light sandy soil, and brought forward in frames, planting them out in the flower border in May or June. When the flowers are ready to expand, they are carefully lifted with balls of earth adhering to the roots and repotted. If early shifted into large pots, these may be sunk in some warm border, the stems being tied to stakes, and the pots being lifted on the approach of cold weather.

TÜBINGEN, a walled town of Würtemberg, circle of Schwarzwald, situated on the left bank of the Neckar at its junction with the Ammer, 18 m. S. by W. from Stuttgart, and 59 m. E. from Strasbourg; pop. about 10,000. It is noted for its university, founded in 1477, which has a library of 200,000 volumes, and is attended by about 650 students.

TUCKER, ABRAHAM, an English metaphysician, born in London, Sept. 2, 1705, died in 1774. He was educated at Merton college, Oxford, and entered the Inner Temple, but was never called to the bar. In 1727 he purchased Betchworth castle, near Dorking, with a large estate belonging to it, and there devoted himself to the study of agriculture. In 1755 he published a pamphlet against strong political feeling, entitled "The Country Gentleman's Advice to his Son on the subject of Party Clubs." About this time he began his great work, "The Light of Nature Pursued, by Edward Search," 4 volumes of which were published in 1765; but a part of it had already appeared in 1763 under the title of "Free Will." A criticism on the work in the "Monthly Review" elicited from him a reply entitled "Man in Quest of Himself, by Cuthbert Comment." He became blind in 1771, but continued to work upon his "Light of Nature Pursued" until the close of his life, the remaining volumes of which were edited by his daughter, after his death. The best edition of his work is that of Sir Henry Mildmay (7 vols. 8vo.; reprinted in 1837 in 2 vols. 8vo.).

TUCKER, HENRY ST. GEORGE, an American jurist, born in Virginia in 1779, died in Winchester, Va., Aug. 28, 1848. He received a liberal education, devoted himself to the legal profession, and became president of the court of appeals and professor of law in the university of Virginia. From 1815 to 1819 he served as a member of the lower house of congress. Among his legal works, which gave him a high reputation, are: "Lectures on Constitutional Law;" "Commentaries on the Laws of Virginia" (2 vols. 8vo., Winchester, 1836); and "Lectures on Natural Law and Government."

TUCKER, JOSIAH, a British divine and political writer, born in Laugharne, Caermarthenshire, in 1711, died in Gloucester, Nov. 4, 1799. He was educated at St. John's college, Oxford, took orders, and in 1749 was presented to the rectory of St. Stephen's, Bristol. In 1758 he was made dean of Gloucester. He published a number of treatises relating to political economy, the earliest of which was entitled "A Brief Essay upon the Advantages and Disadvantages which respectively attend France and Great Britain with regard to Trade" (1748). His pamphlet entitled "The Case of going to War for the sake of Trade, considered in a new Light" (1763), was translated into French by Turgot. His most remarkable publication was "Reflections on the Present Matters in Dispute between Great Britain and Ireland" (1785). He also began a work on the "Elements of Commerce and Theory of Taxes," which he did not finish. For his support of the bill allowing Jews to be naturalized he was burned in effigy by the people of Bristol. At the time of the American revolutionary war he strenuously resisted the claims of the colonies, but at the same time opposed coercion, as he believed that the possession of colonies was detrimental to the interests of a country. In the controversies upon this war he came into collision with Burke, who in his speech on American taxation, in April, 1774, treated him with no great respect. In theology he wrote an "Apology for the present Church of England," "Letters to Dr. Kippis," and "Religious Intolerance no part of the General Plan either of the Mosaic or Christian Dispensation." He likewise published "Seventeen Sermons on some of the most important Points of Natural and Revealed Religion." His works have never been collected.

TUCKER, St. George, an American poet and jurist, born in the island of Bermuda, June 29, 1752, died in Nelson co., Va., in Nov. 1827. He was educated at the college of William and Mary, and studied law, but on the breaking out of the revolutionary war took up arms, and planned and aided personally in a dangerous but successful attempt to capture a large amount of stores in a fortification at Bermuda. In 1778 he was married to Mrs. Randolph, the mother of John Randolph of Roanoke. At the siege of Yorktown he was present in the capacity of a lieutenant-colonel. After the conclusion of the war he was elected a member of the general court, and while holding this position was also law professor in William and Mary college; and he was one of the commissioners to the convention which in 1786 met at Annapolis, Md., and recommended the convention by which the present constitution of the United States was formed. In 1803 he was appointed judge of the court of appeals, and subsequently in the district court of the United States. He was the author of a large number of minor poems, one of which, entitled "Days of my Youth," has retained its popularity; and he published an essay on the question "How far the Common Law of England is the Common Law of the United States;" a treatise on "Slavery" (1796); a letter on the "Alien and Sedition Laws" (1799); and an annotated edition of Blackstone's "Commentaries." His poetical works, which have never been collected, would fill several volumes.—**Beverly**, an American lawyer and novelist, son of the preceding, born in Matoax, Va., Sept. 6, 1784, died in Winchester, Va., Aug. 26, 1851. He was educated at William and Mary college, studied law, and in 1809 settled in Charlotte co., and in 1815 in Missouri, where he became a judge. In 1834 he became professor of law in William and Mary college, and held that position until his death. He published a work on "Pleading," lectures on the constitution of the United States under the title of "The Science of Government," and novels entitled "George Balcombe" and "Gertrude;" but his most remarkable production was an unfinished novel called "The Partisan Leader," first printed in 1837, and reprinted in 1861. The scene is laid in Virginia in 1849, 12 years after its first publication, and Mr. Van Buren, the head of a republic in name, but of a monarchy in reality, is represented in his third presidential term. At the time of its republication it attracted great attention, as showing how long the project of a secession of the southern states had been entertained, and for the accuracy with which it foretold much that had since happened. Beverly Tucker was also a contributor to the "Southern Review," and had begun shortly before his death a life of John Randolph, his half brother.

TUCKERMAN, Henry Theodore, an American author, born in Boston, April 20, 1813. He received his education in Boston and its vicinity, and in 1833, when about to enter college, was induced by the state of his health to visit Europe. Having passed a winter in Italy, he returned to America in the summer of 1834, and 3 years later revisited Europe, and passed nearly 2 years in Sicily and Florence. In 1845 he removed from Boston to New York, where he has since resided, except during the summer months, which he passes chiefly in Newport, R. I. In 1850 he received from Harvard university the honorary degree of A.M. In 1835 appeared his first publication, "The Italian Sketch Book," a collection of descriptive and historical sketches, essays, and tales; and since that time he has occupied himself exclusively with literary pursuits, having been a regular and frequent contributor to the "North American Review," the "Christian Examiner," the "Democratic Review," "Graham's Magazine," the "Southern Literary Messenger," "Putnam's Monthly," the "Atlantic Monthly," and other periodicals, in the pages of which the essays, æsthetic, biographical, and critical, which form the bulk of his works, were originally published. His next work in the order of publication was "Sicily, a Pilgrimage" (1839), in which the author's experience is described under the guise of fiction. It was followed by "Rambles and Reveries" (1841); "Thoughts on the Poets" (1846), devoted chiefly to masters of the English school (translated into German by Müller); "Artist Life, or Sketches of American Painters" (1847); "Characteristics of Literature" (1849), of which a 2d series appeared in 1851; "The Optimist" (1850), a collection of miscellaneous essays; a "Life of Commodore Silas Talbot" (1851); "A Month in England" (1853), the fruits of a brief visit to Europe in 1852; "Memorial of Horatio Greenough" (1853); "Leaves from the Diary of a Dreamer" (1853); "Biographical Essays" (1857). In 1851 a collection of his poems, embracing an elaborate metrical essay entitled "The Spirit of Poetry," was published in Boston. Among his incidental writings may be mentioned a comprehensive "Sketch of American Literature," appended to Shaw's "Outlines of English Literature."

TUCKERMAN, Joseph, D.D., an American clergyman, born in Boston, Jan. 18, 1778, died in Havana, Cuba, April 20, 1840. He was graduated at Harvard college in 1798, and in 1801 was settled as pastor of a Unitarian society in Chelsea, near Boston, where he remained for 25 years. He became greatly interested in improving the condition of seamen, who composed a large portion of his parishioners, and in 1812 was instrumental in the formation of the first charitable society for their benefit in the United States; and he wrote and published several tracts for seamen in connection with this society, which eventually led to the formation of the American seamen's friend society and other institutions for sailors. In 1826 he resigned his pastorate and commenced laboring as a missionary among the poor in Boston, at first at his own expense; and at the end of 18 months he had brought 250 families under his supervision and instruction, providing for most of them food, raiment, and occupation, as well as religious instruction. Others were stimulated by his efforts to undertake the same work. In 1830 he wrote an essay "On the Wages paid to Females," which received a prize offered in Philadelphia. His labors and articles in the religious periodicals led to the organization of the "Benevolent Fraternity of Churches" for the support of a city mission, called the "Ministry at Large," and Dr. Tuckerman became one of its ministers; in 1831 his reports to it were published in a 12mo. volume (2d ed., 1832). While on a visit to Europe in consequence of his impaired health, he promoted the organization of similar institutions for the poor in several cities of Great Britain. On his return he resumed his labors, and published "Principles and Results of the Ministry at Large;" but his health again failing, he sailed for Cuba, where he died. His remains were interred at Mount Auburn, where a fine monument has been erected to his memory.

TUCUMAN, a province of the Argentine Confederation, bounded N. by Salta, E. by Gran Chaco, and S. and W. by Santiago and Catamarca; area, 37,000 sq. m.; pop. about 50,000. In the W. the surface is traversed by several offsets from the Andes, but in other directions there are extensive plains. The most important rivers are the Salado, Tala, and Medinas. There are several shallow saline lakes, and in many places extensive tracts covered with fossil salt. The water of nearly all the streams is brackish. The climate of the plains is hot. The soil affords good crops of grain and fruits, and excellent pasturage. The exports consist chiefly of cattle and timber, the latter of which is sent to Buenos Ayres and also to Potosi. Capital, Tucuman, or San Miguel de Tucuman.

TUDOR. See Henry VII.

TUDOR, William, an American author, born in Boston, Jan. 28, 1779, died in Rio Janeiro, March 9, 1830. He was educated at Phillips academy, Andover, and at Harvard college, where he was graduated in 1796, and entered the counting room of John Codman, in whose employ he visited Paris. He afterward made a tour to Italy and the continent, and on his return engaged in founding the "Anthology Club," and contributed various articles to its journal, the "Monthly Anthology." In 1815 the first number of the "North American Review" appeared under his editorship, and three fourths of the first 4 volumes were written by him. In 1819 he published a volume entitled "Letters on the Eastern States;" in 1821 a volume of "Miscellanies;" and in 1823 a "Life of James Otis." In 1823 he was appointed U. S. consul at Lima, and in 1828 was made chargé d'affaires at Rio Janeiro, where he wrote a work published anonymously under the title "Gebel Teir" (Boston, 1829). He was one of the founders of the Boston Athenæum, and it is to him that the country is indebted for the first suggestion of Bunker Hill monument.

TUESDAY, the third day of the week. In the Roman calendar it was called *dies Martis*, from Mars, and its present name is derived from Tiw, the Anglo-Saxon god of war.

TUFA. See Calcareous Springs.

TUFTS COLLEGE. See Medford.

TUI. See Poe Bird.

TUILERIES (Fr. *tuile*, a tile), a royal palace with extensive gardens in Paris, lying between the Seine and the rue Rivoli, and E. of the Place de la Concorde, so named because it occupies the site of a former manufactory of tiles. The present building was commenced in 1564 by Catharine de' Medici, wife of Henry II., according to the plans of Philibert Delorme and Jean Bullant, who built the central pavilion, called the *pavillon de l'horloge*, the two adjoining wings, and the pavilions by which they are terminated. Henry IV. added a range of buildings ornamented with large composite pilasters and a lofty pavilion at each end of the original structure, the whole presenting a façade 336 yards in length by 36 in depth, running at right angles with the river, and in a direction nearly N. and S. The same monarch also commenced the gallery fronting the Seine which connects the S. extremity of the building with the Louvre, and which was finished by Louis XIII. and Louis XIV. The latter harmonized the architecture of the whole building, replacing the spherical dome of the *pavillon de l'horloge* by a quadrangular one; and in 1808 Napoleon I. commenced a northern gallery along the rue Rivoli, parallel to that already constructed. This was completed by Napoleon III., and the Tuileries and the Louvre now form one great connected pile, enclosing the Place du Carrousel, which is separated from the court of the original palace of the Tuileries by an iron railing. The front of the building, in spite of glaring architectural incongruities, is exceedingly imposing, and the interior unsurpassed in magnificence by any royal residence in Europe. The gardens of the Tuileries, lying west of the palace and extending to the Place de la Concorde, embrace a quadrangular area of nearly 50 acres, and are among the most attractive public resorts in Paris.—After the completion of the palace of Versailles no French king lived in the Tuileries until 1789, when Louis XVI. found himself compelled to remove thither from Versailles. On Aug. 10, 1792, the Parisian populace stormed the building and massacred the Swiss body guard of the king. It subsequently became the residence of Napoleon during the consulate and the empire, and of the Bourbons after the restoration. During the revolution of July, 1830, it was again taken by the people; and at the expulsion of Louis Philippe in Feb. 1848, it was for the third time ransacked. It is now the imperial residence of Napoleon III., who is (1862) rebuilding the *pavillon de Flore* on the front corner next the river.

TUISCO, THUISCO, or TEUT (Anglo-Saxon, TIW), the god whom the ancient Germans revered as the earth-born founder of their nation. He was represented as a gray-bearded man, with uncovered head clad in the skin of an animal, holding a sceptre in his right hand, and stretching out the left. His son Mannus (man), by Hertha (earth), was the first of the Teutones (*Teutsche*, *Deutsche*, Germans), and the father of the progenitors of their three principal tribes. Both Tuisco and his son gave laws to their nation, and the name of the day on which the early Germans held judicial meetings, Tuesday, is derived from that of the former.

TULA. See TOOLA.

TULARE, a S. E. co. of California, bounded S. W. by the Coast range, and N. E. by New Mexico, and drained by Owen's and Kern rivers and other streams; area over 12,000 sq. m.; pop. in 1860, 4,638. The Sierra Nevada mountains traverse the central part of the county. The agricultural productions are of small amount. Gold is abundant, and in 1858 there were 9 quartz mills; placer mining is also pursued. Tule lake, over 30 m. long and about 20 m. wide, is in this county. Capital, Visalia.

TULIP (Persian, *thoulyban*, turban), the name of a superb garden flower of the natural order of the *liliaceæ*, known for its great number of sorts, all derived from a single species, the *tulipa Gesneriana*, a native of the Levant. The tulip has a bulbous root, from the apex of which issue a few broad, glaucous, herbaceous leaves, surrounding at base a simple stem (scape), which usually supports a single flower composed of a perianth of 6 colored petals, within which is a row of 6 subulate stamens, which are not so long as the petals, surrounding a 3-angled, 3-celled ovary, whose stigma is sessile, 3-lobed, triangular, persistent; the fruit is a capsule filled with many smooth flattened seeds. The garden tulip appears to have been cultivated for a long period among the Turks; it was introduced into western Europe in 1554, and first described by Conrad Gesner shortly afterward. Its ripe seeds were regularly imported into Holland from Constantinople, and that country soon became distinguished for its trade in bulbs. In Great Britain it is assiduously nurtured, and superb sorts have originated there among gardeners and amateur florists from continued culture and from the sowing of its seeds, a process which is long and tedious, from 5 to 20 years being required to ascertain the possible qualities of the seedling plants. The finest varieties of the plant amount to several hundred, each bearing some distinctive trivial name; the specific differences between them consist in the manner in which the colors are distributed upon the petals. Thus, such tulips as have certain general and predominant colors are divided into 4 sections, each of which comprises very many sub-varieties. When the yellow ground of the flower is marked with purple or scarlet of different shades, it is called *bizarre;* when its white ground is marked, lined, striped, or variegated with violet or purple only, of various shades, the tulip is called *byblœmen;* such as are variegated with scarlet, crimson, cherry color, or rose are called rose tulips; and those which have a white or yellow ground without any marks are termed selfs or plain-colored. When those colors occur in a broad central stripe in any of the flowers of the 3 first kinds, the tulip is said to be flamed; and when they are arranged on the petals in delicate pencillings, the tulip is feathered, this style being very beautiful. The selfs have but a single color, yet by changing the character of the soil or by other processes they may become variegated, and these tulips are called "breeders," because employed to breed or propagate the choicest kinds. The development of these variegated colors is termed the breaking of the tulip, and it is not unusual that several years are requisite to produce the desired effect. The precise *rationale* of this result does not seem to be well ascertained, but it is perhaps only the continuous effort of nature to produce the normal condition of striped flowers, the self color being only primitive and transitional. A good tulip flower must not only be well colored and pencilled, but its form must be perfect. Thus the properties of a good tulip consist in its being from one third to one half of a hollow globe, the edge smooth and even, the petals thick, and the marking of colors unbroken round the exposed edges of the petals when expanded, but this edging must not extend more than half way down the petal; all the 6 petals must be precisely alike, the colors well defined, the base of the petals free from the slightest stain, and the flower stem straight and stiff, from 18 to 36 inches high. The garden tulip loves a rich loam, and when its best effects are to be studied, the different sorts are selected with reference to this, and are planted in long narrow beds so that they can be readily inspected when in full bloom, or can be protected by awnings from the sun and rain. The beds should be in some open, airy situation, free from the shade of trees or of houses, and all surplus moisture should be carried off from their surface. The usual width of a bed is 4 feet, and one 21 feet long will contain 280 bulbs placed 6 inches from the edge and 6 inches apart each way. It is usual to plant duplicate roots, as some may not blossom; and even if all should do so, still the effect will be better. A bed of 100 rows and 700 bulbs or roots, containing 400 varieties judiciously selected and well arranged, will produce a very brilliant display. Such beds in preparation should be furnished with 20 inches depth of compost soil, consisting of two parts of fresh, rich, rather sandy loam, and one part of well rotted cow dung. The time for setting the bulbs is about the middle of September, when they are to be planted 5 inches below the surface. In the United States a slight covering of boughs, leaves, or sea weed will be found to be sufficient protection in winter, removing it in the spring when the plants push themselves above the surface. During their growth all weeds are to be carefully pulled up and the beds kept clean and tidy. After blooming and on the fall of the petals the seed vessels should be broken off in order to prevent the bulb from becoming weak through the effort to ripen the seeds; and when the foliage has turned brown and dry, the bulbs are to be carefully lifted out, dried, and cleaned, and put away for replanting. The tulip will bloom very well for several years, however, without any such extra care; but when the blossoming is feeble, indicating a too crowded state of the roots, they should be transplanted at the proper season.—There are some early sorts of tulips much prized in gardens, known in the flower catalogues as the Van Thol and sub-varieties of the sweet-scented tulip (*T. suaveolens*, Willd.). These are all dwarf, the stem leaves ovate-lanceolate in outline, the scape low, bearing an erect flower, the petals of which are a rich scarlet edged with yellow. Their humble habit renders them fit to mingle with crocuses on the edges of hyacinth beds, or to force in pots or water glasses for flowering in January or February. The double flowers of this species, as well as the double-flowering varieties of the common garden tulip, are in less esteem than the single flowers, though curious objects; but even oddly formed flowers of certain single sorts are well known, such as those called parrot from their particolored tints of green, yellow, and red, and their large, coarse, twisted, and undulate petals.—There are several other distinct species of the genus *tulipa* known, but they are seldom seen unless in botanic gardens; such as the wild tulip (*T. sylvestris*, Willd.), with narrow leaves, a somewhat drooping stem bearing a solitary yellow flower, the petals ovate-acuminate, hairy at their extremities, and the stamens hairy at the base; the small yellow tulip (*T. Celsiana*, Persoon), with a solitary, erect, greenish yellow flower with lanceolate petals, growing wild on the banks of the Volga; the 2-flowered yellow tulip (*T. biflora*, Pallas), found on the salt deserts in company with the last and not half its size, its flowers fragrant; the Italian tulip (*T. Clusiana*, Redouté), with red and white flowers of lanceolate petals; the many-flowered tulip (*T. Breyniana*), with small reddish yellow blossoms, indigenous to the Cape of Good Hope; and even in Siberia occurs a species (*T. Biebersteiniana*), with yellow and purple flowers appearing in June and July.—The commercial value of tulips at the present time is regulated like that of other commodities; and collections of very superior sorts may be procured for reasonable sums of money. The extraordinary traffic in them two centuries since in Holland, known as the tulipomania, was rather a gambling speculation than any actual transfer of the variety bargained for; and sometimes no individual root of the particular kind was in existence.

TULIP TREE (*liriodendron tulipifera*, Linn.), the name of a genus of North American trees containing a single species, and belonging to the natural order of *magnoliaceæ*. They are exogens with distinct carpels, usually large involute stipules, and imbricated corollas. The tulip tree is tall and stately, its trunk large and columnar, its head open and spreading, its limbs stretching strongly upward, and its branches proceeding outward at all angles. The bark of the trunk is of a dark ashen color, and is somewhat smooth, that of the young shoot brown or chestnut color, smooth with a grayish bloom and with narrow dots. The leaf bud is formed by 2 stipules cohering at their edges to form a sort of sheath, within which a minute leaf is seen folded together and bent down. By this arrangement, as each leaf expands, it is protected by the stipule until fully grown. The leaves are 4-lobed, each lobe ending in round or else sharp points, and separated by shallow broad sinuses, the terminal lobe ending abruptly as if cut off. Their color is a light green above and whitish or glaucous beneath, and their surface is smooth. Some variety exists in the acuteness or bluntness of these lobes. The flowers are large, solitary, and specious, the flower bud enclosed in a 2-triangular-leaved sheath, which falls on the expansion of the flower. The sepals consist of 3 concave, subcoriaceous, greenish, striated, spreading divisions, which are at length bent backward; the corolla of 6 fleshy, greenish yellow and dotted petals, striped and marked at base by a crescent-shaped orange spot; the pistil is large and of a conical shape, surrounded by numerous stamens with long anthers. Some varieties are known in gardens, distinguished by the shape of the foliage or the color of the flowers.—The tulip tree extends from New England along the Atlantic coast to Florida. It is also found abundantly in Upper Canada, and in the western states, where it attains its largest size, 120 to 140 feet high. Its beauty even when young renders it valuable for artificial planting in pleasure grounds or on highways and on the sides of streets. It propagates readily from seeds and layers, and by budding and grafting. Its seeds should be sown in the autumn in a fine mould and in cool and shady spots. The timber of the tulip tree is much prized as a substitute for pine where that is not found, and for panel work in coach building. The bark of its roots and branches possesses a bitter pungent, aromatic taste, and aromatic odor, and can be made to act as a stimulating tonic, diaphoretic, and sudorific. According to Bigelow, it can be successfully employed in the treatment of chronic rheumatism and intermittent fevers.

TULL, Jethro, an English agriculturist, born about 1680, died in Jan. 1740. He owned an estate near Hungerford, on the borders of Oxfordshire and Berkshire, and observing the advantage of cultivation of plants in rows, and of stirring and pulverizing the soil between them, he introduced this system of cultivating the soil. Encouraged by his success, he was led to adopt the erroneous principle that manure was not needed, as finely pulverized earth and moisture were sufficient for the growth of plants. This in the end ruined him, and brought discredit upon his system for a long time. He published a treatise on his new mode of cultivation (1731), and detached essays, which in 1751 were collected in one volume. (See Agriculture, vol. i. p. 230.)

TULLIUS, Servius. See Servius Tullius.

TULLOCH, John, a Scottish clergyman, born in Tibbemuir, Perthshire, in 1822. He was educated at the university of St. Andrew's, and in 1844 was ordained a minister of the church of Scotland, having previously been licensed as a preacher and presented with a charge in the town of Dundee. Afterward he visited Germany, and studied the speculative theology of that country. In 1849 he removed to the parish of Kettins in Forfarshire, and in 1854 was appointed principal of St. Mary's college in the university of St. Andrew's. He has been a contributor to the "British Quarterly" and "North British Review;" in 1855 received the second of the Burnett prizes on the "Being and Attributes of God," amounting to £600; in 1859 published "Leaders of the Reformation;" in 1861, "English Puritanism and its Leaders;" and in 1862, "Beginning Life—Chapters for Young Men."

TULLUS HOSTILIUS, the third king of Rome, reigned from 673 to 641 B. C. The most memorable event of his reign is the war with Alba, celebrated by the single combat between the Horatii and the Curiatii, and the consequent acknowledgment of Roman supremacy. In the war against Fidenæ, an Alban army was led to the assistance of Rome by Mettus Fuffetius, the Alban dictator, who intended to go over to the enemy at the critical moment. Tullus discovered the treachery, had the traitor torn in pieces from chariot wheels, razed Alba to the ground, and transferred the inhabitants to Rome, where the great mass of them became the Roman *plebs*. After these successes Rome was afflicted with a pestilence, preceded by awful prodigies, and the king himself was seized with the disease. To propitiate the gods, he consulted the *Commentarii* of Numa; and having found the formula with which Numa had sacrificed to Jupiter Elicius, he attempted to call down the god, but fell into an error in the use of the formula, and the god in his anger destroyed the king and his household by lightning. The account of Tullus Hostilius cannot be regarded as historical. He was probably the founder of the third patrician tribe, the Luceres.

TULLY, William, an American physician and botanist, born in Saybrook, Conn., Nov. 18, 1785, died in Springfield, Mass., Feb. 28, 1859. He was graduated at Yale college in 1806, studied medicine at Philadelphia, and in 1808 settled in practice at Milford, Conn. He removed about 1815 to Upper Middletown, now Cromwell, Conn., where he became the intimate friend of Dr. Thomas Miner, whose views in relation to the nature and treatment of spotted fever (see Miner, Thomas, and Spotted Fever) he adopted and practised; and in 1819 or 1820 he established himself at Middletown. In 1822 he published with Dr. Miner the essays known as "Miner and Tully on Fever." In 1824 he removed to East Hartford, Conn., and soon afterward was elected president and professor of materia medica in the medical institution at Castleton, Vt. In 1827 he removed first to Albany, and afterward to Castleton, for greater convenience in delivering his lectures. In 1829 the trustees of the medical college vacated all the professorships and suspended the school for 3 years. He was professor of materia medica in the medical institution of Yale college from 1830 to 1841, when he resigned on account of disagreements on medical subjects with the other professors, which gave rise to a violent controversy. In 1851 he removed to Springfield, Mass. He passed his latter years in poverty, occupied with the preparation of his work on materia medica (4 vols. 8vo., Springfield, 1857-'60).

TUMBREL. See Cucking Stool.

TUMOR (Lat. *tumeo*, to swell), a morbid swelling on any part of the body, not caused by inflammation. The classification of tumors has long tasked the ingenuity of surgical pathologists; but lately microscopic investigation has furnished the basis of a new arrangement of them, which, if not scientifically correct, has the advantage of practical utility. They are divided into tumors whose histological elements are similar to those which exist in the normal textures, and tumors whose elements differ histologically from those found in the normal body. The first are termed homologous tumors, and are benign or non-malignant; of themselves they exercise no very deleterious influence, but they may be productive of serious inconvenience by their bulk, or of death by their pressure on important organs; while, as a result of mechanical injury or irritation, they are subject to inflammation and ulceration. The second class of tumors, whose elements form no part of the normal tissues, are termed heterologous or heteromorphous; they are malignant, having a tendency to convert the surrounding tissues into structures resembling their own, are attended with a constitutional cachexia, and independent of extrinsic causes have a tendency to softening and ulceration. Homologous or non-malignant tumors again are variously subdivided. Under the head of sarcomatous tumors are classed: 1, tumors consisting of hypertrophies or excessive growths of certain glandular structures, as of the mammæ, the thyroid gland, the testicle, &c.; and 2, tumors whose structure approximates to that of the ordinary areolar tissue. Fibrous tumors are formed exclusively of fibrous tissue; occasionally, when they are large and of long standing, calcareous salts are deposited within them, and sometimes cysts containing fluid are met with in their substance. They are commonly movable and enclosed in a cyst formed from condensed cellular tissue. Polypi of the uterus, the nose, and the ear are usually fibrous tumors. Neuroma is a form of fibrous tumor which occurs in connection with the spinal nerves. "It is remarkable," says Rokitansky, "that neuroma is never deposited in the centre of a nerve, but at its side, so that only a small part of its fasciculi is displaced; the displaced fasciculi are spread abroad and stretched over the tumor, while the greater mass of the nerve remains on the other side uninjured, and with its fibres in connection with one another." Fatty tumors are characterized by their name; they are formed of fat cells more or less intermixed with areolar tissue. The term encysted tumor is confined to tumors in which no organized connection exists between the cyst and its contents. Sometimes there is a single cyst, and sometimes there are numerous cysts connected together. The contents of the cysts vary greatly in character and consistence; they may be watery or glairy, of the consistence of honey (meliceritious), of pap (atheromatous), or of lard (steatomatous). They vary greatly in color; occasionally they may contain hair, teeth, or bony matter. Cartilaginous tumors (*enchondroma*) may occur in glandular organs, the breast, parotid gland, &c., and in the interior of bones, or more commonly in their outer surface; they may become ossified, or may undergo soft or fatty degeneration. Finally, true osseous tumors are met with; they are almost invariably developed on and within bone, and may be soft or cancellar in their texture, or compact and of an ivory-like hardness, and sometimes attain an enormous size.—Heterologous or malignant tumors include all the varieties of cancer. Tubercle seems to form a connecting link between homologous and heterologous tumors.

TUMULUS. See BARROW.

TUNBRIDGE WELLS, a market town of Kent, England, situated in a beautiful country, 15 m. S. W. from Maidstone; pop. in 1851, 10,587. It is a fashionable watering place, and consists chiefly of clusters of houses standing on detached eminences, and of a parade lined with fine trees on one side, and on the other with assembly rooms, libraries, and shops. The surrounding country abounds in mineral springs. The one to which the place owes its origin is a light pure chalybeate, and the water is considered remarkably efficacious in cases of weak digestion.

TUNGSTEN (Swed. *tung*, heavy, and *sten*, stone), a metal existing in the form of an acid combined with lime in the mineral scheelite or tungstate of lime, and also combined with iron and manganese in the mineral wolfram. Tungstic acid was discovered by Scheele in 1781, and metallic tungsten somewhat later by the brothers D'Elhuyart. Its German name *Wolframium* gives to it the symbol W, by which it is known in chemistry. It is obtained as a heavy iron-gray metal, very hard and difficult of fusion, and of the high specific gravity 17.6, by intensely heating tungstic acid made into a paste with oil, in a crucible lined with charcoal, for some hours. The tungstic acid is procured by decomposing the tungstate of lime with hydrochloric acid, which dissolves the lime and leaves the tungstic acid. The chemical equivalent of tungsten is 92.—Tungsten combines with several other metals, forming alloys of interest. Its combination with cast iron is remarkable for its extraordinary hardness; and it is said that cast steel containing 45 per cent. of tungsten is greatly improved in tenacity, hardness, and susceptibility of taking a fine temper. According to experiments made at the polytechnic institute at Vienna, steel of this kind exceeded all others in ability to resist compression. It is prepared by the use of the mineral wolfram, which is first purified by roasting, pulverizing, and washing, lastly with dilute hydrochloric acid; it is then mixed with coal dust and heated to redness in a crucible for 3 hours. The gray porous mass thus obtained, consisting of metallic tungsten and carburets of iron and manganese, is thrown into the crucibles in which cast steel is melted. Before casting the steel the heat of the fire is increased for 10 or 20 minutes. The objection to the use of tungsten for this purpose is the difficulty attending all new methods of manufacturing steel, viz., that of producing an article in large masses of uniform quality.—Of the two oxides of tungsten, W_4O_3 and WO_3, the latter only, or tungstic acid, is of particular interest. This occurs native in bright yellow cubes, also as an earthy substance like ochre at a few localities, as at Lane's mine, Munroe, Conn., Cabarrus co., N. C., &c. But the usual form of the acid is in the combinations already named, and of these wolfram ($MnO, WO_3 + 3FeO, WO_3$) is the most common ore of the metal. This is a brownish black mineral, of metallic lustre, of hardness 5 to 5.5, and specific gravity 7.1 to 7.55. It is often found associated with tin ore in Cornwall, Saxony, Bohemia, and France. In the United States it has been found at Munroe, Conn., with native bismuth, galena, blende, &c., also at Trumbull in the same state, and near Mine La Motte, Mo., and Blue Hill bay, Me. Its detrimental effects to the ores of tin have already been noticed in treating that metal. By the chemical method adopted of separating the tungsten ores from the tin ores, a tungstate of soda is obtained, which is easily dissolved, and is found of value as a mordant in calico printing, and possesses the important property of rendering fabrics uninflammable. (See INCOMBUSTIBLE CLOTH.) Tungstic acid is also found in combination with lead, forming the mineral scheeletine, and also with copper, and it occurs in small quantity in the mineral yttrotantalite. The artificial tungstate of lead produces a pigment resembling white lead. The following are some of the attempted applications of the compounds of tungsten to economical purposes: tungstic acid for coloring yellow; oxide of tungsten for coloring blue; tungstate of soda in dyeing and calico printing, and as a substitute for stannate of soda.

TUNICA, a N. W. co. of Mississippi, bordering on the Mississippi river, which separates it from Arkansas, and intersected by the Tunica and Coldwater rivers; area, 750 sq. m.; pop. in 1860, 4,367 of whom 3,484 were slaves. The surface is flat, and in many places swampy, and the soil fertile. The productions in 1850 were 94,735 bushels of Indian corn, 7,270 of sweet potatoes, and 717 bales of cotton. Capital, Austin.

TUNICATA. See MOLLUSCA, vol. xi. p. 631.

TUNIS, one of the Barbary states of N. Africa, bounded N. and E. by the Mediterranean, S. E. by Tripoli, S. by the desert of Sahara, and W. by Algeria, between lat. 31° and 37° N., and long. 8° and 11° E.; extreme length about 440 m., average breadth 160 m.; area, 70,000 sq. m.; pop. 2,500,000. Beside the capital, of the same name, the chief towns are Kairwan, Soosa, Hammamet, Bizerta, and Kaff. The coast line is irregular, and has 3 extensive indentations, forming the bays of Tunis, Hammamet, and Cabes. The only considerable river is the Mejerda (anc. Bagradas), which falls into the bay of Tunis after a N. E. course of about 200 m. Near its mouth, and for some distance W. of it, there are several large lagoons. The lake of Al-Sibbah, 70 m. long and 25 broad, near the border of the Sahara, becomes nearly dry in summer, when a layer of salt is found on its bed. The interior of Tunis is but little known. The N. W. portion is mountainous, the summits having a height in many places of 4,000 or 5,000 feet. The mountains are well timbered, and have many tracts of cultivated land and olive plantations on their lower slopes. An extensive plain or table land, 100 m. long by 30 broad and quite level, extends from this region to the gulf of Hammamet; it is nearly destitute of trees, and is used by the Arabs for pasturing their horses and camels. To the S. of this plain the country is believed to be nearly desert, though in ancient times it was celebrated for its fertility. Silver, lead, and copper are found in the mountains. The climate is very healthy; rain falls at intervals between November and April, but droughts prevail during the rest of the year. In winter the average of the thermometer is 56° and in summer 84°, the mean of the whole year being 69°. Wheat, barley, maize, &c., are raised, but dates furnish the principal subsistence of the inhabitants. Olives, tobacco, cotton, indigo, and various drugs and dyes are grown; and all the fruits of Europe are abundant. The principal domestic animals are horned cattle, mules, and camels; the breed of horses, which was once so famous, has been allowed to degenerate. The tunny fishery on the coast is very extensive. The lion, panther, lynx, ounce, wolf, and wild horse are the principal wild animals.—The people of the interior are different tribes of Arabs and Kabyles, while those of the coast are an admixture of Turks, Moors, Jews, and renegade Christians. They are generally good-looking, but very ignorant. The language is a dialect of Arabic, but a bastard Italian is used by the traders. The Arabs resemble the Bedouins of Arabia in their mode of life, but are inhospitable to strangers. The Kabyles live on the mountains in villages of rudely constructed huts, and subsist chiefly on dates, bread, and milk. Arms are carried by all classes, and on the borders of Algeria the inhabitants do not acknowledge allegiance to either government. The religion is strict Mohammedanism. The principal manufactures are woollen fabrics, particularly the red caps so much worn along the shores of the Mediterranean; considerable numbers of skins are tanned and dyed; and some trade is carried on with Europe and the interior of Africa. The government of Tunis, though nominally dependent on Turkey, is in reality perfectly independent. The bey's power is absolute, and his will the only law known in the country. There are many ancient ruins in different parts of Tunis, more particularly on the banks of the Mejerda, where at Dukhah (anc. Thugga) there are temples, an arch, a number of cisterns, baths, barracks, gates, theatres, an aqueduct, and many inscriptions. The great aqueduct which conveyed the water 52 m. from the mountain of Zagwam to Carthage can yet be traced along the whole line, while there are portions still standing which rise to the height of 98 feet in some places. Under the Romans this country formed the province of Africa, and was divided into Zeugitana in the N. and Byzacena in the S.; and its most important cities were Carthage, Utica, Hippo Zantus (Bizerta), Leptis Minor, Thapsus, Hadrametum, and Zama. —TUNIS, the capital, is situated on the W. side of a lagoon at the mouth of the river Mejerda, 400 m. E. from Algiers, in lat. 36° 48 N., long. 10° 24′ E.; pop. estimated at from 130,000 to 200,000. It is surrounded by a double wall 5 m. in circuit, and defended by a strong castle, which commands the approach from the sea, and by several forts. It has a very imposing appearance when viewed from a distance; but the streets are narrow and dirty, and the houses generally exceedingly mean, consisting of a single story without windows toward the streets.

The town is well supplied with water. There are many handsome mosques, and several large barracks, one of which has room for 4,000 men. There are a Moorish college and several schools, a Roman Catholic church and convent, a Greek church, a theatre, and numerous public baths and bazaars. The manufactures are principally woollen cloths and caps, embroidery, leather, and essences of musk, rose, and jasmine. An extensive trade is carried on, the principal exports being oil, caps, soap, grain, wool, hides, cattle, sponges, wax, gold dust, and ivory, and the imports cotton, linen, and woollen goods, tin, lead, iron, coffee, sugar, spices, &c. The depth of water at Tunis is only 6 or 7 feet, and vessels lie in the bay and discharge by lighters.—Tunis derives a great deal of the interest attached to it from being situated a short distance from the site of ancient Carthage; but it is itself a place of great antiquity. During the Punic wars it often changed masters. In A. D. 429 it fell into the hands of the Vandals, and about a century afterward became subject to the Greek empire, under which it remained till N. Africa was overrun by the Mohammedans about the end of the 7th century. Early in the 13th century it became independent. In 1535 Charles V. made it tributary to Spain, but in 1574 it was conquered by the Turks. The Moors ultimately enforced their right of electing their own bey, only agreeing to pay a certain tribute to the sultan of Constantinople. The pirates afterward became very daring, but in Cromwell's time received severe chastisement from the British under Admiral Blake, and afterward from France and Holland. In 1816 the Tunisians agreed, under threat of being treated as the Algerines had been by Lord Exmouth, to renounce piracy and Christian slavery. Under Achmet Bey (1837) and his successors, Mohammed Bey (1855) and Mohammed Sadyk Bey (1859), various reforms have been effected or initiated, including the suppression of the slave trade, declaring the children of slave parents free, the suppression of many monopolies and oppressive taxes, the equality of all subjects, the establishment of military conscription and of mixed tribunals, and the creation of a municipal government for the administration of affairs in the capital. French influence has long been predominant in the country and is exerted in favor of reform.

TUNKERS. See Dunkers.

TUNNEL, in civil engineering, an underground passage, usually constructed for conducting a canal or road through elevated grounds. In mining the term is also sometimes applied to horizontal excavations, especially to such as have been described under the head of Adit. In Europe tunnels are a more common feature upon railroads and canals than in this country, and some of the most important upon the former have been noticed in the article Railroad, vol. xiii. p. 737. On the canals of England there are 5 tunnels exceeding 3,000 yards each in length, the longest being the Marsden (Huddersfield), which is 5,500 yards long. In France there are 4 long tunnels, one of which, the Noirieu (St. Quentin canal), is 13,128 yards long, and cost only $13.52 per yard. The Mauvages (Marne and Rhine canal), 5,320 yards long, cost $314.60 per yard. Tunnels are no new feature in engineering either in the eastern or western hemisphere. Mention is made in the article Andes of the tunnels carried through elevated points encountered by the roads constructed by the incas of Peru; and in the article Aqueduct it is mentioned that they opened similar ways for the conveyance of water from the reservoirs in the mountains several hundred miles distant. The tunnels of the ancient Romans made for a similar purpose are also there noticed. Others were made by them for the drainage of lakes, one of the most remarkable of which was constructed by the emperor Claudius between Lake Fucinus (now the lake of Celano) and the river Liris (now Garigliano). This was cleared out some years since by order of the Neapolitan government, and a minute account of it, as it then appeared, is published in "Blackwood's Edinburgh Magazine," vol. xxxviii. p. 657, in a paper entitled "Eight Days in the Abruzzi." This tunnel proved to be about 3 m. long, 30 feet high, and 28 feet wide at the entrance, and nowhere less than 20 feet high, constructed in part through solid rock, and in other places lined with masonry. The excavation appears to have been conducted after the plan practised at the present time, by means of a number of vertical shafts first sunk on the line of the tunnel, from the bottom of which the work was carried on simultaneously in opposite directions. Another tunnel, made at an early period of the Roman republic for the partial drainage of the Alban lake, is more than a mile long. In Bœotia is a tunnel of very ancient date constructed for the drainage of Lake Copais. The most remarkable tunnel is that under the Thames river at London, of which further mention will be made in the course of this article.—The methods and cost of constructing tunnels vary greatly with the materials through which they penetrate. The operations are in general similar to those employed in mining, of which some account is given in the article Mine. They are not limited to the driving through of a horizontal passage, but long tunnels involve the necessity of sinking shafts from the surface down to their level, not merely for expediting the work in the manner alluded to above, but the shafts are almost indispensable as a means of ventilation, which is effected for some distance beyond their foot as soon as an opening can be made through them and the portion of the tunnel leading to the nearest entrance. If the ground over the tunnel rises to very great height, as in passing through the base of a mountain, shafts may be impracticable, and the work can then be pushed forward only from the two ends; and artificial means for ventilation must be adopted, as by the use of steam or water power to drive in through large pipes a great body of air to keep the atmosphere sufficiently pure and clear from powder smoke for the men to conduct their work with safety and advantage. Short tunnels may be excavated without shafts; and if in strata easy to break and remove, with no access of large quantities of water or of quicksand, the work may be conducted at a cost not exceeding $70 or $80 per yard to the ordinary dimensions of railroad tunnels; indeed, some tunnels have been made at rates much less than these. The expense, however, rapidly increases with the hardness of the rock, or by its giving place to loose materials, especially of a sandy nature. With access of water these form quicksands that flow through any apertures permeable to water itself; and when these are pressed down by a column extending upward into higher grounds, their exclusion is one of the most difficult operations attending the construction of tunnels. Sometimes, in ground elsewhere solid, fissures are struck which are channels of such matérials, and let them down in a continuous current of prodigious force, sweeping away every obstacle opposed to it. For such reasons work estimated and let for $200 per yard has cost over $650; which is about the highest expenditure paid for tunnelling, except in the case of the Thames tunnel, the expense of which was about $6,000 per yard. In loose ground, or in rock not thoroughly bound together, so that pieces are in danger of falling, a lining of brickwork in the form of an arch, and of thickness sufficient to sustain the pressure that will come upon it, is necessary; and this is made either to follow close upon the excavation as it goes on, or, if the ground is sufficiently safe to stand till the excavation is completed, the lining may be afterward built up throughout the whole tunnel, or only in those places that need it most. In case of carrying the lining on with the excavation, it is sometimes necessary to keep a wooden lining as far in advance as practicable, and within this construct the permanent brick lining. When the floor of a tunnel is of loose material, this may be pressed upward, and springs of water may break forth threatening serious injury to the foundations of the lining and sides and floor of the work. In such cases the lining of brickwork must be extended over the whole floor, and this is done in the form of an inverted arch; the bricks are laid endwise across the arch in several courses and in hydraulic cement. It has happened in using common mortar in the brick lining of tunnels, that this before hardening has been squeezed quite out from between the bricks, letting them come together, and causing so much injury as to render the construction of an inner lining essential to save the work. The laying out a long tunnel, which is to be excavated from both ends, and from shafts sunk along its line, is often a nice piece of engineering work. Its line is run over the surface with the transit instrument, and the range of its centre is established with the greatest exactness either upon piers especially constructed for the purpose, or upon posts firmly set in the ground. The places of the shafts are then marked on this line, and when these have been sunk perpendicularly to the required depth, two plumb lines suspended in each shaft on the central or transit line give the direction below of this line. To prevent the vibration of the plummets, they are received at the bottom in buckets of water or cups of mercury. The transit instrument is used at the bottom to carry out the line; the magnetic needle cannot be trusted for this work on account of its liability to variation from local attraction. The tunnel may be extended from the shafts of its full size at once, or narrow headings may first be run through, and afterward enlarged. If the ground is suspected to be of a changeable character, a small drift is sometimes run quite through before any contracts are let, as by this means a correct idea is acquired of the nature of the difficulties to be encountered. As the excavation is carried out, those parts which require a lining are made as much larger than the proposed width and height of the tunnel as the thickness of the brickwork on both sides. This may consist of 3 lengths of brick, making altogether 4 feet; and in addition to this there may be a space for the primary wooden lining, which cannot in all cases be removed, but must be built in behind the brickwork. All vacant spaces behind the masonry are thoroughly tamped and rammed with earth and stone; and if the ground is very treacherous, the curvature of the sides, top, and bottom is made to approach to that of a circle, thus securing the strength of the arch figure in every direction. The shafts are left after the completion of the tunnel as chimneys for ventilation; and they are sometimes enlarged to great size with the view of transmitting the light of day into the dark passage below. The purpose they serve in the latter respect is, however, of little importance. An oblong opening termed an eye has also in some instances been carried down from the surface along the line of a tunnel for purposes of ventilation and light. In the Bishopton tunnel, England, there is such an eye 800 feet long.—The most costly of all tunnels yet completed, and probably the most useless, is that under the Thames river between Wapping and Rotherhithe, London. As early as 1798 it was proposed by Ralph Dodd, an engineer, to open a passage under the river between Gravesend and Essex; and in 1804 others proposed the locality finally selected for this enterprise. In 1807 a shaft was sunk 315 feet back from the river, and from this the tunnel was to proceed; but the work was abandoned on account of the influx of sand and water. Trevithick, the engineer, after this carried a drift under the bed of the river to the distance of 1,046 feet; it was 5 feet high, 3 feet wide at the bottom, and 2½ at the top. The work was stopped within about 200 feet of the opposite shore by the water breaking in. Nothing more was done until 1823, when Mr. M. I. Brunel submitted new plans, which were favorably received, and a company was formed to carry them into execution. The place selected for the commencement of the work was on the Rotherhithe shore, 150 feet from the river, where the opposite banks are but 1,000 feet apart. In order to sink a large shaft through the quicksand to the required depth, Mr. Brunel constructed a cylinder of brickwork 50 feet in external diameter, with walls 3 feet thick resting upon a curb of timber, and covered at the height of 45 feet with another similar curb, the two being tied together by 48 wrought iron screw bolts 2 inches in diameter, and the whole space between the two curbs being filled in with the brick walls. This was built upon 24 piles that were driven into the ground a little outside of the curb, and were furnished each one with a shoulder for receiving it. There was also an undercurb of cast iron, having a sharp cutting edge for penetrating the ground. The cylinder being built and the cement having become hard, the earth within was excavated, and hoisted out by means of a steam engine placed on the top of the shaft, and 16 of the piles on which the shaft rested were driven down, two opposite ones together half an inch at a time. Thus the whole went gradually down, carrying by the great weight of 910 tons the other 8 piles. All the piles were finally removed when they were no longer needed for guiding the downward movement of the shaft, and this was made to descend to the depth of 40 feet, when it became jammed by the external pressure. Below this the construction of the walls in masonry as the excavation went down was a matter of great difficulty on account of the loose character of the ground. The walls, increased to 4 feet in thickness, were built of stone laid in cement and lined with 2 courses of brick. At the depth of 80 feet a central shaft 25 feet in diameter was sunk as a well for the drainage of the tunnel. At this depth the pressure was so great as to cause the ground to give way suddenly, and a quantity of sand and water was blown up. In Jan. 1826, the excavation for the tunnel was commenced at the depth of 63 feet. This was laid out 38 feet wide and 22¼ high, and to carry such an excavation forward through loose materials charged with water to an inexhaustible extent, and under a pressure of a column 70 or 80 feet high, required appliances of an entirely novel character. In a large portion of the ground, no part of the face of the work, of the top or sides, and sometimes of the floor, could be left exposed even for a few minutes, without careful watching and the means of shutting it off immediately with a counteracting pressure superior to that exerted inward. The brickwork lining, it was evident, must follow closely upon the excavation, and it alone could furnish the support against which the protection in front might be braced. This protection, it was also evident, must consist of a multitude of individual parts, which could be removed successively and each be replaced and pushed forward as the excavation behind admitted. The height of the tunnel required several stages for workmen to operate simultaneously, that the whole might be carried on together. These requirements were supplied in 12 great frames of cast iron, making altogether what was termed a shield, filling as they were placed side by side the whole width of the tunnel, and each extending the whole space between the floor and the roof; each could be moved forward in its turn 6 inches at a time without movement of the others, by means of powerful screws, one at the top and one at the bottom, bracing against the brickwork behind; and each frame had 3 compartments or floors one above another, each of which was occupied by a workman. The tops of all the frames and sides of the outer ones were covered with smooth iron plates, up to which the brickwork was kept as closely as possible; and the support was on flat soles which could be slipped forward with the machine. The front of each compartment or cell was protected by a series of narrow boards which might be kept close up against the end of the frame or be separately pressed forward a few inches. Each workman in his cell removed first the upper one of these boards, and excavated, for the most part with his hands, the earth thus exposed for about 6 inches inward; then replacing the board, he pushed it forward and caused it to remain by the pressure of jack screws bracing against the frame; the next board below was then removed and the operation repeated at this point, and so on; and when all had been thus carried forward, the frame itself was moved up to them. In bad ground the danger attending the removal of a single board was often very serious, as may be inferred from the fact that through apertures hardly perceptible, or not admitting a single finger, the clay would obtrude itself in a continuous current; and it was sometimes the case that the workman would be driven out of his cell, and this being then tightly closed would become entirely filled, and so would be left till the "run" was checked by operations continued in other parts. The brickwork all around the excavation was laid in concentric, independent courses within the rectangular outer portion, which conformed in shape to that of the shield, and was finished in two archways separated by a middle solid wall extending entirely through, 3½ feet thick at the top and 4 feet at the bottom; thus making two tunnels side by side. Through this wall transverse arches form occasional openings from one tunnel to the other. The width of each tunnel at the springing of the arch is 13 feet 9 inches. The plan of the work included a carriage way and a narrow footpath along the central wall, also a lining of cement throughout. Only one archway, however, has been thus completed.—Many interesting circumstances were connected with the construction of this tunnel. For some time the excavation was in a stratum of clay and unattended with serious difficulties. These commenced on breaking into a fissure filled with sand and gravel, the passing of which occupied 32 days. With the close of the year 1826, the first year's work in tunnelling, the progress was 350 feet. The floor of the tunnel was made to slope down at the rate of 2¼ feet in 100, in order to give sufficient depth of ground in the middle of the river above the brickwork, which however was not after all more than 10 feet. Even near the shore it was found that there was much danger of the river bursting through into the tunnel; portions of the bed frequently settled, and to fill the cavities thus formed large bags of clay were sunk in the river. Constant examinations were made of the bottom by men descending in a diving bell; and it happened that a shovel and hammer lost from the diving bell were afterward found among the earth which broke into the tunnel. The first serious accident occurred on May 12, 1827, at a distance of 544 feet from the shaft, the water rushing in with such violence that within 15 minutes the tunnel was filled and the men narrowly escaped with their lives. On examining the break with a diving bell, the arches and shield were seen to be undisturbed; and the displacement of earth was estimated at 25,000 cubic feet. The method adopted to prevent further influx of water was to cover the hole with tarpaulings, and fill in bags of clay, of which about 3,000 were used, each containing a ton. The water was then pumped out, and on June 27 the tunnel was again entered; but it was not until the end of September that matters were restored, so that the shield again began to move forward. On Jan. 12, 1828, 605 feet in, and just under the middle of the river, the water burst in so suddenly that the tunnel was almost immediately filled, and 6 workmen were drowned. Mr. Brunel, the only other person in the tunnel at the time, had a most narrow escape, being swept forward by the flood into the shaft, up which he was carried as it filled with water. The cavity in the river was filled with 4,000 tons of clay in bags, and the water was again pumped out, so that the tunnel was reëntered on April 12. The funds of the company being now exhausted, a solid wall was built across the extreme end of the archways, and the work was abandoned for 7 years, during which time one of the archways was kept lighted with gas and open for exhibition. The government finally agreed to furnish the funds required, and the work was again taken up, but advanced very slowly on account of the increasing difficulties. Three more breaks occurred, and one life was lost. In Jan. 1841, the tunnel had reached the opposite bank, when the work in it was stopped until the shaft at this end could be completed. This shaft was made upon similar plans to the other, only with a slight taper from 53 feet diameter at top to 55 feet diameter at the bottom, in order to prevent its being jammed in descending. A driftway from this shaft reached the tunnel on Aug. 13, and toward the last of November the middle frames of the shield came up to the walls of the shaft, through which they were passed in the same manner as they had passed through the ground, and the brickwork of the tunnel was soon after closed up with that of the shaft. The tunnel was opened for foot passengers on March 12, 1843. Its total length between the shafts is 1,200 feet. It was originally proposed to complete it with a carriage road winding around the shafts at a gradual descent; but it has not been deemed expedient to incur the additional expense which this would involve, and the tunnel has been used only for foot passengers who pay a toll of 1 penny each. Its total cost has been £454,714, of which £180,000 was subscribed by the original shareholders or was raised upon debentures. The receipts arising from the tolls and the renting of stalls in the cross arches scarcely amount to enough to keep the work in repair and good order.

TUNNY, a marine fish of the mackerel family, and genus *thynnus* (Cuv.). The body is elongated and compressed, with a slender tail keeled in the middle, and with 2 oblique cutaneous folds at the base of the caudal fin on each side; mouth large, with the teeth small, awl-shaped, in a single row on each jaw, and fine and crowded on the vomer and palate; there are 2 dorsals, near together, the posterior followed by 9 or 10 finlets opposite those of the anal fin; scales largest around the pectoral region, forming a kind of corslet, on the anterior part of the back, and along the lateral line; cerebellum remarkably large, as would be expected in such an active fish. The common tunny of Europe (*T. vulgaris*, Cuv.) attains a length of 15 to 20 feet, and a weight of more than 1,000 lbs.; it is dark blue above, the corslet lighter, sides of head white, and below grayish white spotted with silvery; 1st dorsal, pectorals, and ventrals black, the other fins mostly flesh-colored; the pectorals are scythe-shaped, and ⅕ the length of the body. It is a very active and voracious fish, feeding on herring and the small migratory species; it is very abundant at the E. and W. ends of the Mediterranean, and in its narrowest portions generally, approaching the shores in summer in large shoals for the purpose of spawning; at this time they are captured in large nets arranged in a funnel-like form, into the wide mouth of which the fish enter, and, being gradually driven to the narrower end, are killed by lances and harpoons; a single line of nets often extends more than a quarter of a mile, costing about $6,000. Its flesh is highly esteemed, being very solid, almost like meat, as firm as that of the sturgeon, but finer flavored; it is red before it is cooked, and is served at table in a great variety of ways, in all of which it is considered delicious and wholesome; for this purpose its capture has been energetically prosecuted from the earliest antiquity. It is found also in the Atlantic and in the North sea. The ancient Byzantium was especially enriched by the tunny fishery, the gulf here, according to Cuvier, having received the name of the Golden Horn from the wealth derived from the capture of this fish, though Gibbon gives a different explanation of this name; even at the present day these waters swarm with the tunny, but the indolent Turks pay little attention to this source of food and wealth. The Phœnicians established a fishery at the other end of the Mediterranean, on the coast of Spain, at a much earlier period, and representations of the tunny are often seen on their coins and medals. A salted preparation of this fish was called by the Romans *salsamentum Sardinicum*. The principal fishery of the present time is carried on in Sicily and Sardinia. The tunny is very timid, and easily driven by loud noises to its own destruction.—The American tunny (*T. secundo-dorsalis*, Storer), called also horse mackerel and albicore, attains a length of 9 to 12 feet; it is nearly black above, silvery on the sides, and white below; gill covers and pectorals silvery gray; iris golden; ventrals black above and white below; finlets mostly yellow; the 2d dorsal is much higher than the 1st, anal further back than in the European tunny, and the pectorals shorter. It is found from New York to Nova Scotia, coming into Massachusetts bay about the middle of June and remaining through September; it gets very fat by the end of August, and is then valuable for the oil, which is obtained by boiling the head and abdomen; a single fish will thus yield about 20 gallons; it is taken by the harpoon, and affords very exciting sport, as the fish is active, strong, and tenacious of life; it feeds on menhaden and other small shoal fish; it is hated by the fishermen for its injury to their nets, and is rarely used here except for mackerel bait; the flesh, however, resembles lean pork, with a fine mackerel taste, and in time will probably be frequently seen in the markets; it is not a very common fish.—The tunny of the tropics (*T. pelamys*, Cuv.), with other allied genera of the family, has been described under Bonito.

TUNSTALL, or Tonstall, Cuthbert, an English prelate, born at Haldeford, Yorkshire, in 1474 or 1475, died at Lambeth palace, Nov. 18, 1559. He was educated at Oxford and Cambridge, became a fellow of the latter university, afterward studied at Padua, where he received the degree of LL.D., and was made rector of Harrow-on-the-Hill in 1511, and in 1515 archdeacon of Chester. In 1516 he was appointed master of the rolls, and sent to Brussels as commissioner to the emperor Charles V., with whom he concluded two treaties of alliance and commerce. After being prebendary of York and Salisbury, and dean of the latter, he was in 1522 made bishop of London, and in 1523 lord privy seal, and during the next 6 years was twice ambassador to Spain and France. In 1530 he was translated to the bishopric of Durham. He soon after resigned the privy seal, but among all the changes effected in the church by Henry VIII., and those introduced by Edward VI., he kept his place as bishop, and was also a member of the privy council and of the king's council in the north. Through the influence of the duke of Northumberland he was finally deprived of his bishopric in Oct. 1552, and committed to the tower. On the accession of Mary he was reinstated; but refusing to take the oath of supremacy on Elizabeth's accession, he was again deprived in July, 1559, and remained the guest of Parker, archbishop of Canterbury, till his death. He wrote *In Laudem Matrimonii* (4to., London, 1518); *De Arte Supputandi Libri IV.* (4to., 1522), a treatise on arithmetic, often reprinted; "Compendium and Synopsis," an abridgment of Aristotle's "Ethics" (8vo., Paris, 1554); "A Defence of Predestination" (4to., Antwerp, 1555); and a volume of prayers (8vo., 1558).

TUOLUMNE, an E. co. of California, bounded N. by the Stanislaus river and E. by the Sierra Nevada mountains, and drained by the Tuolumne river; area, about 1,500 sq. m.; pop. in 1860, 16,229. The surface is level in the W. part, and in the E. mountainous and covered with excellent timber, which is largely exported; the soil of the valleys is very fertile. The productions in 1858 were 10,740 bushels of wheat, 70,080 of barley, and 19,260 of oats. There were 30 quartz mills, 4 grist mills, and 22 saw mills. It is one of the most important mining counties of the state. Capital, Sonora.

TUPELO, an aboriginal name applied to several species of *nyssa*. According to Prof. Gray, it belongs to the *cornaceæ* or dogwood family, comprising both trees and shrubs with simple, entire, or rarely toothed leaves, destitute of stipules; perfect or else polygamous flowers, succeeded by berries or drupes of one or two cells. The species most diffused throughout the country seems to be the *N. multiflora* of Wangenheim. (See Black Gum.) The large tupelo (*N. uniflora*, Walter) becomes a large tree in the swamps of North Carolina and southward; its leaves are 4 to 6 inches in length, long-petioled, ovate or oblong, entire or sometimes sharply toothed, downy beneath, or occasionally slightly cordate; the fertile blossoms borne on a single peduncle; the fruit oblong, blue, an inch or more long. Its timber is soft, and its roots so spongy and light that they are employed as buoys to fishing nets. The water tupelo (*N. aquatica*, Linn.) is likewise a large tree, found growing on the edges of ponds and in the pine barrens from North Carolina to Florida; its leaves are short-petioled, varying from lanceolate to orbicular obtuse, slightly cordate; the fertile flowers 1 or 2 on short peduncles; drupes oval, blue. The timber is of little value except for fuel. The Ogeechee lime (*N. capitata*, Walter) is a small tree, rarely exceeding 30 feet in height; its leaves are large, short-petioled, oblong, oval, or obovate, mucronate or acute; the perfect flowers solitary on a short peduncle; drupe an inch long, oblong, red, the stone deeply striated; the pulp of an agreeable acid, from which circumstance the tree is called the lime. It occurs naturally near the sea coast in swamps from Georgia to Florida. Its berries when boiled in sirup form an agreeable preserve.—The tupelos are indigenous to North America, varying much in mode of growth, shape of the leaves, and general contour, so much so that many alleged species described by botanists are referable to a few common types. Abroad they are in esteem for ornamental planting, and are raised from seeds or layers.

TUPPER, Martin Farquhar, an English miscellaneous author, born in London, July 17, 1810. He is the son of a physician, and received his education principally at the charterhouse, and at Christchurch, Oxford, where he was graduated B.A. in 1832, proceeding M.A. in 1835 and D.C.L. in 1847. He studied law at Lincoln's Inn, and in 1835 was admitted to the bar, but has never more than nominally practised the profession. He had already contributed many articles to the periodicals, when in 1837 appeared his "Proverbial Philosophy, a Book of Thoughts and Arguments originally treated," the first half of which was written in 1836 in a lawyer's chambers. This work brought him into immediate popularity, and, in spite of much severe criticism, has passed through 49 editions in England, and still commands an annual sale of 5,000 copies. In America nearly 500,000 copies have been sold, and the work has been translated into several continental languages. In 1845 he was elected a fellow of the royal society, and has also received the Prussian gold medal for science and art. Of his numerous succeeding works, both in prose and verse, the most important are: "A Modern Pyramid to commemorate a Septuagint of Worthies" (1839), a series of sonnets and essays on 70 celebrated men and women; "An Author's Mind" (1841), containing plans of 30 unpublished works; three tales on covetousness entitled respectively "The Crock of Gold," "Heart, a Social Novel," and "Twins, a Domestic Novel" (1844); "Probabilities, an Aid to Faith" (1847); and poems entitled "Hactenus," "Ballads for the Times," "Lyrics," "Things to Come," "A Dirge for Wellington," "War Ballads," "Church Ballads," "White Slavery Ballads," "International Ballads," and others which have appeared anonymously. Many of these works have passed through several editions. At the time of the great exhibition of 1851 he published in several languages a "Hymn for all Nations." During later years he has published "Rifle Ballads," in aid of the rifle club movement; "King Alfred," a patriotic play; "The Poems of King Alfred," translated from the Anglo-Saxon into the corresponding English metres; "Three Hundred Sonnets;" "Paterfamilias's Diary of Everybody's Tour" (1856); "The Rides and Reveries of Mr. Æsop Smith;" and the novel of "Stephen Langton," a picture of England in the days of King John. He has also written fugitive poems on many topics of passing interest, and has furnished to periodical literature, including the "Quarterly Review," a considerable number of contributions. In 1851 Mr. Tupper made a visit to the United States. His life has been spent principally in retirement at his estate, inherited from his mother, in the parish of Albury, near Guildford, Surrey.

TURANIAN RACE and LANGUAGES. Next after the Indo-European and Semitic families of nations and languages, the most important to the linguist and ethnologist is that which is spread over the greater part of central and northern Asia, and also a not inconsiderable portion of Europe. For, though gifted with inferior capacity for advancing, or even for appropriating and profiting by civilization, it occupies a wider territory than any other race, and has played an important part in the political history of the world. Its constituent members (chiefly according to Castrén) are as follows: 1. The Finno-Hungarian or Ugrian branch. Its subdivisions are: *a*, the Ugric, including the Hungarian or Magyar as principal member, with the Vogul and Ugro-Ostiak, in and beyond the Ural; *b*, the Bulgaric, including the Tcheremizes and Mordvins, scattered tribes along the Volga; *c*, the Permian group, of the Permian, Zyrianian, and Votiak, in eastern Russia; *d*, the Finnish or Tchudic, including the Lapp, the Finnish proper, or Suomian, and the Esthonian. This is the most western branch of the family, lying chiefly within the limits of Europe; it is also the one of highest endowment, most perfect language, and most advanced culture, and more than one of its members, as the Hungarian and Finnic, are not unworthy of the place they occupy among nations of higher race. 2. The Samoyedic branch, comparatively insignificant in numbers, position, and history, and one of the lowest races of the Asiatic continent. The Samoyedes occupy the inhospitable shores of the Arctic ocean, from the White sea to beyond the North cape of Asia, and some of their tribes are still left in the northern mountains of central Asia, from which the others are supposed to have descended, following the course of the rivers northward. 3. The Turkish or Tartaric branch, the most widely spread of all, reaching from Turkey in Europe to beyond the middle of central Asia, with important outliers in the yet more remote north-east, as the Yakoots of the Lena. Its subdivisions are very numerous, but are grouped together in three chief classes: those of the south-east, in and to the east of Toorkistan or Independent Tartary; those of the north, including among others the Kirgheez, Bashkirs, and Yakoots; and those of the west, stretching from northern Persia through Asia Minor and the Crimea to Constantinople, and scattered in patches over the

European dominions of the sultan. 4. The Mongolian branch, lying yet further east. The Mongol race, since its wonderful career of conquest in the 12th and 13th centuries—in which, however, Turkish tribes were the chief agents—has shrunk again within its ancient borders, and lives in insignificance under Chinese domination. 5. The Tungusian branch; of this, the principal race is the Mantchoo, which has held China in subjection during the past two centuries.—It has been sought to extend still further the boundaries of this immense family, by attaching to it the Dravidian races of southern India, and even by tying on all the other Asiatic peoples (excepting the Chinese), the Malays and Polynesians, and the North American tribes; but such sweepingly synthetic classification is, in the present stage of linguistic ethnology, to be regarded as utterly unscientific. Even the combination of the branches above stated into one family has but recently been made with confidence.—As the Indo-European languages are much more varied and diverse in their development than the Semitic, so they are, in their turn, vastly exceeded in this respect by the idioms now under consideration. The law of linguistic connection prevailing among the latter is quite peculiar; between tribes confessedly of near kin exist differences of linguistic material even in cardinal points, such as the pronouns, numerals, and important affixes of derivation. A marked similarity of linguistic method, however, runs through them all, and helps to stamp them as kindred. They are all formed on what is called the agglutinative type; that is to say, the root or theme everywhere maintains its form almost unchanged, and all formative syllables are suffixed, never prefixed, to it; and they enter with it into no close and intimate union, giving rise to forms which are accepted by the mind, without analysis, as signs for the complex idea; they remain in the condition of loosely appended elements. There are no varieties and irregularities of nominal and verbal flexion; each language has but a single declension and a single conjugation. The plural of declension is formed by a pluralizing particle, to which the same case-endings are then attached as in the singular. Grammatical gender is a thing unknown. The cases are numerous. Prepositions always follow the words they govern; as, indeed, it is a general rule that the governed word precedes the governing. Words connecting sentences—relatives and conjunctions—are hardly employed at all. A marked phonetic peculiarity running through all the dialects is the law of harmonic sequence of vowels; the vowels are divided into two classes, heavy and light, and within the same word only heavy or only light vowels can follow one another; the vowel of a suffix, or those of a series of suffixes, changing to conform themselves to the character of that of the root. The languages are rich in harmonious and well developed vocabularies, so far as the sound goes, and they abound in nice distinctions of certain kinds; yet their rank in the general scale of language is but a low one; they are deficient in sharp distinction of the principal grammatical categories, and awkward, cumbrous, and incomplete in the expression of thought. This character belongs to them in varying degree; the Mantchoo dialects are the poorest of all; and the Mongol do not much surpass them; the Tartaric idioms hold the middle rank; the tongues of the Finnish branch, particularly the Finnish proper and the Hungarian, possess a marked superiority to the others. Most of the languages of the family are known only in their present condition, having no monuments by which their history can be followed back into the past. A properly national literature none of the branches has ever had, if we except the mythic and legendary songs of the Finns, recently collected from the mouths of the people, and combined to form the *Kalevala*, and the mostly lyric popular songs of the Hungarians; but even some of the remoter tribes have, under the influence and by the aid of foreign teachers, acquired the arts of writing, and have brought forth religious and historical works, while the Hungarian and the Turkish have developed important literatures. It is also asserted within a few years past, that on the cuneiform monuments of Mesopotamia and Persia is represented, in the inscriptions of the third order, an Ugrian dialect, and that we have there authentic evidence and remains of an ancient Ugrian civilization, which is even asserted to have preceded and formed the basis for that of the other races in the same region. These results of a small number of investigators are not yet fully accepted by scholars in general; if they shall prove true, they will constitute a fact of the highest consequence in the history of this family, and indeed in that of the human race, and will modify many of the hitherto prevailing opinions of ethnologists.—Respecting the name by which the whole family should be called, there is great diversity of opinion. By some it is named from one of its principal branches, or from more than one, and is styled the Mongolian, the Tartaric, the Finno-Tartaric, the Finno-Tungusic race, &c. Others entitle it the Altaic, from the mountain chain which is regarded as the original home of the tribes, and the starting point of their migrations; or, adding the name of the other mountain chain which furnished a new basis for the dispersion of some of its most important members, they know it as the Uralo-Altaic, or Ugro-Altaic. A common appellation, also, and one which has as much in its favor and as little against it as any other, is Scythic or Scythian, taken from the name given by the Greeks to the wild tribes of the north-east, who were probably, at least in great part, of this race. The authority of Max Müller has recently given currency to the name Turanian, which stands at the head of our article, although we are far from regarding it as the one most worthy of acceptance. It is derived from the traditions of the Iranian or Persian race, in whose national recollections the contest between Iran and Turan, the Aryan race and its Tartar neighbors and foes, is an element of prime importance.—Writers upon this whole family of nations are especially Rémusat, *Recherches sur les langues Tartares* (Paris, 1820); Rask, in several of his philological works; Schott, in numerous memoirs published by the Berlin academy, especially *Ueber das Altaische- oder Finnisch-Tartarische Sprachengeschlecht* (1849); Prichard, in vol. iii. of his "Researches into the Physical History of Mankind;" Castrén, in a series of grammars, essays, accounts of travel, &c. (St. Petersburg, 1853-'8); and Max Müller, "Letter on the Turanian Languages," in Bunsen's "Philosophy of Universal History," vol. i., and "Lectures on the Science of Language" (London, 1861).

TURBAN (Turk. *tulbend* or *dulbend*), a covering for the head worn among most eastern peoples. It varies much in shape among various nations and classes; its usual form is that of a roll of cloth twisted around a cap. The Turks in recent times have generally abandoned it for the fez or red skull cap. The turban of the sultan was ornamented with three heron's feathers and a great quantity of gems, and an officer called the *dulbend aga* was appointed especially to take care of it. The grand vizier was entitled to wear two heron's feathers in his turban, and inferior officers one. The emirs were distinguished by green turbans.

TURBINE (Fr., a shell of spiral form), a submerged, horizontal water wheel, of the class of reaction wheels, with curved vertical buckets or floats, and the revolution of which without and around a fixed horizontal disk, having upon it guides giving direction to the impelling body of water, is made to turn a vertical axis or shaft running through the common centre of the wheel and disk, and by connections from this shaft to give motion to machinery of various kinds. The earlier, and until recently the more common forms of water wheel, were characterized in general by their having the axis horizontal, and by deriving their motion from simple weight or momentum of the water, or from both combined. Since, however, a vertical axis will, in the case of mills for grinding, serve to give motion directly or very nearly so to a millstone, the means of securing effective horizontal wheels with vertical axes have, especially in the grain-producing provinces of France and other parts of Europe, long engaged attention. In the arrangement known in England as "Barker's mill," a horizontal hollow tube receiving and discharging water from a hollow vertical shaft which turns with it, and the ends of the tube opening for discharge in opposite directions, the pressure due to combined effect of height of column and centrifugal force is relieved at each opening, but felt upon the side of the tube opposed to it; the reaction or recoil upon these surfaces gives to the tube and hence to the shaft a rapid revolution; but the form is seldom or never used in practice. The "spoon wheel," used in France, consists of a number of separate curved blades diverging horizontally from the upright axis, upon which a descending stream of water is directed; it gives a fair percentage of work, where the supply and fall are not great. Somewhat similar to both these in principle is the turbine, invented, or perhaps first brought to effective and economical working, by Fourneyron, about 1834. (See FOURNEYRON.) In the employment of the turbine there are two reservoirs or bodies of water at different levels, the wheel and disk already referred to being submerged in the lower of these, and the water, conducted by a flume or large tube from the upper reservoir, is made to descend vertically through a hollow cylinder upon the disk or fixed and solid circular plate lying beneath this; the cylinder not reaching down quite to this disk, there is a lateral circular opening of no great depth completely around and between the two. Immediately without and enclosing or facing this circular opening is the depth (at its inner periphery) of the horizontal wheel, which is thus annular in form, and turns round and without the disk and cylinder. This wheel consists of an upper and under crown, horizontal and of annular form, in the open space between which (usually less, or not much more, than a foot in total depth) are fixed vertically, and running from crown to crown, curved floats or buckets, in form corresponding to those of Poncelet's undershot wheel. The upright fixed guides upon the disk direct the issuing stream of water against the curved floats of the wheel; and as it emerges on all sides, it acts upon all the floats at the same moment and constantly, moving the wheel by one horizontal component of the several pressures on these in the direction of their convex surfaces; a strong circular plate from the wheel descends slightly below the disk, attaching to and moving the solid vertical axis. This axis rises through the cylinder, emerging within a suitable box from the water space to the mechanism above. Its lower pivot is sometimes rested upon a stout lever of the second kind, and near the fulcrum, by connections with which lever the wheel can be raised or lowered alongside of the opening for the escaping water. A movable hollow cylinder, called the regulating gate, can be raised or lowered along the fixed cylinder, so as to diminish when desired the depth of opening and volume of discharge upon the wheel; and in some forms, to prevent the carrying round of dead water in the wheel above this opening, the space between the crowns is divided by a succession of horizontal plates into a number of compartments, so many of which only will be filled as correspond to the opening. The guides upon the fixed disk are also curved in a manner similar to that of the buckets, but in the opposite direction; the result is that the water does not escape radially, but tangentially, and in such course as to strike the buckets almost perpendicularly, thus very greatly increasing its action upon the wheel. In Callon's turbine, the flow into the wheel is regulated by a series of sliding shutters, portions or the whole of which can be let down to cover the opening to the wheel. In Fontaine's improved form, shown in the London exhibition, 1851, the wheel has its floats curving horizontally, and the water descends nearly vertically upon these, but directed against them, its horizontal component of pressure taking effect; this form has some peculiar advantages. The turbines of Jonval and some others are also well known; and the name is sometimes given to Thomson's externally fed wheel, and to others differing from the more usual forms. Fourneyron's turbine, under good conditions, utilized a larger percentage of the force of water than the best ordinary water wheels, namely, from 75 to 80 per cent.; the performance of Fontaine's and of Jonval's is about the same. Among obvious advantages of turbine wheels are these: 1, they occupy little space; 2, the action on the wheel is uniform and uninterrupted; 3, the wheel turning, usually, completely within water, and the pressure outward on the floats being the same in all directions, there is no strain or increased friction in a particular direction upon the axis; 4, turning with great speed, it may directly carry the millstone in flouring mills; 5, being submerged, its performance is uninterrupted by ice, and is little affected by floods or by drought so long as the wheel is covered; 6, it utilizes a larger percentage of the power than ordinary wheels; and 7, its efficiency does not decrease in the same ratio with the velocity, when the height or volume of water is reduced: thus, a wheel at Sainte-Blaise, diameter 22 inches, under a fall of 350 feet, gave 40 horse power, equal to ¾ of the whole power of the water; while another at Gisors, with a fall of 3½ feet, gave ¾, with one of 2 feet, ⅔, and of 1 foot, ⅗, of the whole power.—In the United States, water wheels of the ordinary forms were almost exclusively in use, and among the large manufacturing establishments in New England entirely so, until the year 1844, the breast wheel being regarded as the most efficient practicable. In 1843 Mr. Ellwood Morris communicated to the "Journal of the Franklin Institute," in which several articles in relation to the French reaction wheels had previously appeared, a translation of Morin's "Experiments on Turbines," with an account of some experiments also on two turbines constructed from his own designs; the useful effect of one of these was .75. In 1844 Mr. Uriah A. Boyden, a hydraulic engineer, of Massachusetts, produced for the Appleton company's cotton mills in Lowell a turbine involving several improvements, and of which the efficiency was .78 of the power. In 1846 he had constructed upon his designs, embracing further improvements, three turbines of about 190 horse power each, for the same company; the mean maximum effective power of two of these, carefully tested, was .88 of the power of the water expended—a remarkable advance upon all previous results; and these turbines have continued to perform satisfactorily. The chief features of difference of these wheels from the original one of Fourneyron may be briefly summed up as follows: The flume conducting the water to the turbine is in form of an inverted truncated cone, the water introduced above on one side of the axis of the turbine and cone, and by a gradual curve, so that the water descends with almost no loss of power, save from friction, acquiring an increasing velocity and a spiral movement in the direction of the revolution of the wheel; the guides are accordingly a little inclined backward, so that the water shall meet their edges only. One of the most important parts of the invention is the addition without and around the wheel of two broad stationary disks, the space between which at their inner periphery is very little greater than that between the crowns of the wheel at the part next to them, but which curve outward and apart, so that the space at their exterior periphery is twice as great; the total diameter of these disks being about twice that of the wheel. When the regulating gate is raised to full height, the section through which the water passes in escaping from the wheel is thus gradually enlarged, in a ratio from 1 to 4; hence the action of the water should fall within the same distance from 1 to $\frac{1}{16}$, providing the disks be wholly submerged. This arrangement is called the diffuser; its effect is to diminish the pressure against the water escaping from the outer edge of the wheel, and thus to increase the power in the same ratio as by a certain increase in the available fall. Its principle is thus similar to that of diverging conical tubes for delivery of liquids. (See HYDRO-MECHANICS.) Its theoretical advantage is a gain of .05 power; but, probably owing to irregular movements of the water, the gain practically is about .03 of the power. Mr. Boyden also, by means of a peculiar box with bearings of soft or babbitt metal, suspends the wheel from the top of the vertical shaft, instead of running it on a step at the bottom; while by grooves and mortices the buckets are so firmly fixed between the crowns of the wheel, as to allow them to be much thinner, and to secure a freer passage for the water. In a turbine of this pattern, made in 1851 for the Tremont mills, the guides are 33 in number; the buckets 44; the least height between the crowns, .8743 ft.; greatest height, .9368 ft.; total diameter of the wheel, 8.333 ft.; diameter between inner edges of wheel, 6.75 ft.; diameter of the lower part of the disk, 6.729 ft.; diameter of the wrought iron turned shaft in different parts, 7 to 8 inches. Upon this turbine a series of extremely careful experiments was made, the various data being noted by several observers at the same time, and accurately compared by marking the time at brief intervals. The experiments embrace the quantity of water discharged, the velocity of the wheel, the percentage of power (maximum, in this case, .79⅜) utilized, &c.—For further details and rules respecting the construction and proportioning of turbines, as well as for a full account of the experiments referred to, and the results, and of others in relation to centre-vent wheels and the flow of water over weirs, see "Lowell Hydraulic Experiments" (Boston, 1855).

TURBOT, a marine, soft-rayed fish of the flatfish family, and genus *rhombus* (Cuv.), characterized by minute sharp teeth on the jaws and pharynx, the dorsal fin commencing on the head in front of the eyes, and like the anal extending to the tail, and with the eyes on the left side. The European turbot (*R. maximus*, Cuv.), the finest of the family, sometimes measures 6 feet in width, and weighs over 200 lbs.; the left side is brown and covered with small tubercles, and the right side or lower surface smooth and white; without the tail the body is nearly round; mouth large, opening obliquely upward; eyes in a vertical line, one over the other; gill openings large; pectorals small. It keeps on sandy grounds, and is a great wanderer, usually in companies, living near the bottom, and feeding on small fish, crustaceans, and mollusks; though voracious, it is particular in its choice of food, and will bite at none but fresh bait; the spawning season is about August, after which it soon recovers its good condition. Its flesh is white, fat, flaky, and delicate, and has been highly esteemed from remote antiquity; it is disputed whether this or the next species was the *rhombus* of the ancient Romans; the French call it water or sea pheasant on account of its fine flavor. Though not uncommon on the coasts of Great Britain, most of the turbot sold in the English markets are caught by Dutch fishermen on the long line of sandy banks between England and Holland; the value sent to London market from this source alone is annually not far from $500,000. The fishery begins about the end of March and closes by the middle of August, and is prosecuted both by lines and trawl nets; the hooks are baited with smelts or other small and bright fishes; each Dutch boat brings from 100 to 150 fish, usually weighing each 5 to 10 lbs. In the time of Pennant there was a famous fishery of turbot at Scarborough; to each boat were 3 men, and each man with 3 lines, and each line with 280 hooks; the 9 lines were fastened together and extended at full length across the current, and allowed to remain out 6 hours; a great many fish were caught in this way.—The brill, pearl, or smooth turbot (*R. vulgaris*, Cuv.) is a smaller and less delicate species, with smooth scales, from the same localities and caught in the same manner; the under jaw is the longer, and the upper eye a little behind the lower; it is reddish sandy brown, varied with darker, and sprinkled with white pearl-like specks; under surface smooth and white; it is found in the Mediterranean, as are several other species still less esteemed.—The American or spotted turbot (*R. maculatus*, Girard; *pleuronectes*, De Kay), called also New York plaice and watery flounder, is from 12 to 18 inches long, and 6 to 8 wide, though sometimes attaining a weight of 20 lbs.; it is smooth, on the left side reddish gray with large circular or oblong darker blotches surrounded by a lighter margin, and with numerous white spots, especially on the fins; the lower surface white and spotless; iris silvery; gape wide, with a single row of separate, large, sharp teeth, and a protuberance on the chin; ends of dorsal rays free; body elongated; it resembles the brill more than any other European species. It occurs along the coast of the New England and middle states, and is sometimes taken by mackerel fishers near the shore; it is considered a delicate article of food.

TURENNE, Henri de La Tour d'Auvergne, vicomte de, a French marshal, born in Sedan, Sept. 11, 1611, killed near Sulzbach, Bavaria, July 26, 1675. He was the second son of Henri de Bouillon, prince of Sedan, by Elizabeth of Nassau, daughter of William I. of Orange, and was sent when a boy to Holland, where he learned the art of war under his uncle Maurice. In 1630, visiting the court of France in the interest of his brother Frédéric de Bouillon, he was induced by Cardinal Richelieu to enter the service of France, received the command of an infantry regiment, distinguished himself in Lorraine under Marshal de La Force, became major-general in 1634, and served under La Valette in Germany, where in 1635 he relieved Mentz, then besieged by the imperialists. In 1637, with an auxiliary corps, he joined the Swedish army under Duke Bernard of Weimar, and during this campaign captured several towns, including the stronghold of Brisach. In 1639 he was made lieutenant-general and ordered to Italy, where, under the count d'Harcourt, he defeated the united Austrians and Spaniards at Casale, and forced Turin to surrender in 1640. In 1642 he had the chief command of the French army in Roussillon, and conquered that province from Spain. After the death of Richelieu and Louis XIII. he was made marshal of France, and placed in command of the French army in Germany. He crossed the Rhine, worsted the Bavarians under Mercy, acted in concert with the prince of Condé in the 3 days' battle at Freiburg (1644), was defeated by Mercy at Mergentheim, May 5, 1645, but gained a victory over him in conjunction with Condé at Auersheim, near Nördlingen, 3 months later, and, joining the Swedish general Wrangel, conquered the Bavarians at Lavingen and Zusmarshausen, and forced the elector to sign an armistice, in March, 1647. He then repaired to Flanders, and by taking several places aided in bringing about the peace of Westphalia (1648). On his return to France, his love for the duchess de Longueville and his brother's example connected him with the Fronde. At the head of a Spanish army which was sent to support the rebels, he was defeated near Réthel by Marshal Duplessis-Praslin, and driven out of France (1650). After trying unsuccessfully to bring about a reconciliation between France and Spain, he solicited and obtained a pardon from the French government, returned to his country, and henceforth proved the most loyal supporter of the king, while Condé was the leader of the Frondeurs. He defeated the troops of his illustrious opponent at Bléneau, near the Loire, in April, 1652, followed him up to Paris, inflicted upon him a most severe loss in July in the faubourg St. Antoine, and thus secured the triumph of the royal cause at home. The Spaniards having invaded the north of France under the leadership of Condé, he marched against them, worsted them at Arras in 1654, gained the decisive victory of the "Dunes," June 14, 1658, took possession of Dunkirk, and by these and other successes hastened the peace of the Pyrénées, Nov. 7, 1659. He had been previously made minister of state, and now received the title of marshal-general of the camps and armies of France. In 1667, war being declared against Spain under pretence of vindicating the hereditary rights of Maria Theresa, the wife of Louis XIV., Turenne entered Flanders at the head of the French army, accompanied by the king himself, and in less than three months achieved the conquest of that province; and several of the cities he had taken were secured to France by the treaty of Aix la Chapelle, May 2, 1668. In the war against Holland (1672) he commanded one of the armies that marched into that country; and when the European powers came to its rescue, he entered Germany, advanced to the Elbe, and forced the elector of Brandenburg to a separate peace at Vossem in 1673; then, in a campaign which is considered a masterpiece of strategy, he protected Alsace from invasion, crossed the Rhine at Philippsburg, routed the enemy at Sinzheim and Ladenburg (1674), and drove them back to the Main, and, under orders from Louvois, devastated the Palatinate, laying 30 towns in ashes. In the following winter, with an army of scarcely 22,000 men, he nearly destroyed 60,000 Austrians and Brandenburgers under Bournonville, gaining victories at Mulhouse, Colmar, and Türkheim (Jan. 5, 1675). He now wished to retire from active service; but he was the only French general who could successfully oppose the celebrated Montecuculi, and yielding to the king's entreaties, he continued in command, and during 4 months the manœuvres and strategic operations of the two opposing generals were subjects of general admiration. Finally Turenne forced his rival into a position near Sulzbach where he was constrained to fight at a disadvantage; the French commander consequently had a new victory in prospect, when, surveying the last preparations for the battle which was to take place on the morrow, he was struck in the body by a stray ball, and his death caused his army to fall back beyond the Rhine. His remains were taken to St. Denis, and interred amid the royal tombs. When these were broken open during the revolution, his corpse was found in a perfect state of preservation and taken to a collection of antiquities, where it remained until 1801, when Bonaparte had it transferred to the church of the Invalides. Turenne was originally a Protestant, but became a Catholic in 1668 through the instruction and influence of Bossuet. His life was written by Sandras, Raguenet, and Ramsay. He left *Mémoires* on his campaigns from 1643 to 1658, found in Ramsay's biography, and *Lettres et Mémoires* (2 vols. fol., Paris, 1782).

TURGENEFF, Ivan Sergeievitch, a Russian novelist, born in Orel, Nov. 9, 1818. He was educated at Moscow and at St. Petersburg, and in 1838 went to Berlin to finish his studies. On his return to Russia he obtained a situation in the department of the interior, and made himself known by several national songs, which became very popular; but in consequence of the sentiments expressed in one of them he was disgraced and sent into exile, and from 1847 to 1850 he lived in Germany and France. He has written poems entitled "Panascha" (1843) and "Conversation" (1844); "Memoirs, or Journal of a Sportsman" (2 vols., 1852), twice translated into French; *Scènes de la vie Russe* (2 vols. 18mo., Paris, 1858); and *Une nichée des gentilshommes* (1859), beside various comedies, poems, and articles contributed to the Russian reviews.

TURGENEFF, Nicolai, a Russian author, born in 1790. He was educated at Göttingen, was attached as Russian commissioner to Baron Stein's provisional administration of the reconquered German provinces, was made state councillor, and, being placed at the head of the department of the interior and of economic affairs, devoted himself with ardor to the promotion of schemes for the emancipation of the serfs. In 1819 he joined the "Society of Public Good," founded by Trubetzkoi and Muravieff, and was in consequence involved in the conspiracy of 1825 and condemned to death. He fled to France, and has since resided in Paris. In 1847 and 1848 he published *La Russie et les Russes*, divided into three parts, viz.: *Mémoires d'un proscrit*, *Tableau politique et social de la Russie*, and *De l'avenir de la Russie* (3 vols. 8vo.). He has recently published a pamphlet entitled *La Russie en présence de la crise Européenne*, and also "The Last Word on the Emancipation of the Serfs in Russia" (1860).

TURGOT, Anne Robert Jacques, baron de l'Aulne, a French philosopher and statesman, born in Paris, May 10, 1727, died March 20, 1781. He was educated for the church, and in 1749 became prior of the Sorbonne. In the same year he published a "Letter upon Paper Money:" and abandoning the clerical profession in 1752, he studied law, and in 1753 became counsellor in the parliament and master of requests. Qualifying himself for administrative functions by special attention to natural philosophy, agriculture, manufactures, and commerce, he expounded his views upon the last three subjects in several papers which appeared in the *Encyclopédie* or in pamphlet form. The most remarkable among the latter is the *Conciliateur, ou lettre d'un ecclésiastique à un magistrat sur la tolérance civile* (1754). In 1761 he was appointed intendant of Limousin, and introduced many important reforms in the administration of that province; free transport was allowed to corn and breadstuffs, taxes were alleviated, roads and highways improved, and workhouses and charitable institutions established. In 1766 appeared his *Réflexions sur la formation et la distribution des richesses*, his chief work on political economy. He also published valuable papers on loans and on mines, beside his *Lettres sur la liberté du commerce des grains*. On the accession of Louis XVI. he was called to the navy department; and one month later, Aug. 24, 1774, he was appointed comptroller-general of finances, and undertook to introduce reforms on a large scale. In a letter to the king which was then published, he gave a synopsis of his intended policy; he desired to improve the financial condition of the kingdom by wise economy and integrity; he insisted upon the freedom of labor at home and of trade abroad, and aimed at substituting for taxes on a multitude of articles a single tax on land. Encouraged by Louis XVI., he went to work with tact, prudence, and energy; but these reforms were obnoxious to courtiers and many others. In 1775, troubles having arisen on account of the high price of breadstuffs, he was charged with having caused scarcity by his regulations respecting the grain trade. In Jan. 1776, he caused an edict to be issued, abolishing compulsory labor for the state, internal duties on breadstuffs, the privileges of trading corporations, &c.; but this only increased the number of his enemies; the privileged classes affected by it, the nobles, the clergy, and the chief tradesmen, were so loud in their complaints that the king was afraid to support his minister any longer. Turgot was consequently dismissed in May, and retired to private life, devoting his leisure to science, literature, and philosophy. He was an honorary member of the academy of inscriptions. His *Œuvres complètes*, published by Dupont de Nemours (9 vols. 8vo., Paris, 1808–'11), were reprinted under the supervision of Eugène Daire (2 vols. 8vo., 1844). His biography was written by Condorcet (London, 1796).

TURIN (It. *Torino;* anc. *Augusta Taurinorum*), a city of Piedmont, capital of the kingdom of Italy and of a province of its name, situated in an extensive plain enclosed on all sides except the N. E. by the Alps, at the junction of the Dora-Susina with the Po, 79 m. W. S. W. from Milan; pop. in 1858, 179,635. The Po is crossed by 3 bridges and the Dora-Susina by 2, one of the latter being a magnificent structure of a single arch with a span of 150 feet. Turin is of oblong form, about 1¼ m. long and ¼ m. broad, and is defended by a very strong citadel on the W. The old town has narrow, crooked streets, and ill-built houses. In the new town the streets are broad and cross each other at right angles; and the houses are generally 4 or 5 stories in height, and many of them decorated with sculptures and other ornaments. The approach to Turin from the W. is by a fine avenue, one of the longest in Europe; and there are 18 public squares, the most important of which are the Piazza del Castello, the Piazza di San Carlo, the Piazza di San Giovanni, and the Piazza dell' Erbe. The first of these squares lies near the centre of the town, is almost surrounded by lofty palaces, and derives its name from having in its centre the old palace of the dukes of Savoy, considered one of the finest in Turin; the modern palace, at the N. side of the square, is an extensive building, contains a fine collection of paintings, and has large gardens attached. The theatre, which was built from designs by Alfieri, stands on the E. side. The Piazza di San Carlo is almost entirely surrounded by arcades, and contains a statue of Emanuel Philibert, duke of Savoy, by Marochetti. The buildings of Turin are mostly of brick. The city is not rich in ancient edifices, but many of the modern public buildings are very magnificent. The *duomo* or cathedral of St. John the Baptist, built in the 16th century, is small, and principally remarkable for the beautiful arabesques in the pilasters which adorn the front. The interior has recently been richly decorated with frescoes, and contains some fine paintings. Near it is the chapel of Santo Sudario, a small round building, considered a masterpiece of Guarini. The other churches most worthy of notice are San Filippo Neri, the largest and one of the finest in the town; San Domenico, which contains a fine Virgin and child by Guercino; San Tommaso, of little architectural merit, but possessed of some fine paintings; Santa Cristiana, with a fine façade by Juvara; Corpus Domini, highly ornamented in the interior with marble, gilding, and other decorations; and La Gran Madre di Dio, built in imitation of the Pantheon at Rome, to commemorate the restoration of the royal family in 1814. A Protestant church in the Lombard style was erected in 1853. There are in all 110 churches and chapels; and there were formerly many monasteries and nunneries, but they have been suppressed with the exception of those that are actually engaged in works of charity. Other buildings which deserve notice are the Palazzo degli Archivi Reali or register office, an extensive edifice by Juvara; the custom house, town house, and court house. The senate holds its meetings in the ancient ducal palace, and the chamber of deputies in the Carignan palace, formerly the residence of the royal princes.

The university of Turin was founded in 1412, and is a magnificent building, with a quadrangle surrounded by arcades in which are a number of ancient sculptures and inscriptions. It has a library of 112,000 volumes and 2,000 MSS., originally formed by the dukes of Savoy; a valuable collection of pictures and medals, an excellent Egyptian museum, museums of anatomy and natural history, and a good botanic garden. It has faculties of theology, law, medicine, surgery, and arts, with 84 professors, and in 1858–'9 was attended by 1,376 students. The royal academy of sciences was founded in 1783, and consists of 40 members; it has valuable collections in mineralogy, zoology, and antiquities. There are also an episcopal seminary, a royal military academy, two colleges, numerous elementary schools, and institutions for the deaf, dumb, and blind. The most important charitable foundations are the Retiro delle Rosine, where 400 girls are maintained chiefly by their own industry; the general hospital; the charity hospital, which accommodates 1,500 inmates; the Reale Albergo di Virtù, an industrial school; the Regio Manicomico or lunatic asylum; the Spidale di San Luigi, which receives many inmates and gives relief to a great number of out-door patients; and the Compagnia di San Paolo, established for a great number of objects, including education, marriage portions, and the relief of secret poverty.—The manufactures of Turin include linen, woollen, cotton, and silk goods, leather, paper, glass, china, hardware, carriages, arms, musical and other instruments; and there are numerous distilleries, dye works, and different kinds of mills. The wealth of the city is principally derived from its trade in silk; beside which the commerce includes different manufactured articles, wine, liqueurs, grain, and fruit. Turin is connected by railway with Genoa, Alessandria, Novara, Cuneo, Pinerolo, and Susa. Italian is the language used in official transactions, and both it and French are spoken by the upper classes; but the people generally speak a Piedmontese dialect.—Turin is supposed to have been founded by a tribe called Taurini or Taurisci, of Transalpine origin. Hannibal subdued the surrounding country, but after he retired from Italy the Romans reoccupied it and made Turin a colony under the name of Colonia Julia, which was afterward changed to Augusta Taurinorum in honor of Augustus. Turin was sacked by the Goths, and afterward by the Lombards; and it subsequently passed into the hands of Charlemagne, who conferred it in feudal tenure on its bishops, several of whom ruled it tyrannically. It was afterward governed by the marquises of Susa, and passed by marriage with the heiress of that family to the counts of Savoy. In 1281 it became the capital of the states of the house of Savoy, which with some slight interruptions it has ever since remained.

TÜRK, Karl Christian Wilhelm von, a German educator and philanthropist, born in Meiningen, Jan. 8, 1774, died near Berlin, July 31, 1846. He was educated at Jena, and after completing his legal studies was appointed by the prince of Mecklenburg in 1794 chancery auditor, and in 1796 chamberlain and chancery councillor. In 1800 the supervision of the school system of Mecklenburg was added to his other duties. In 1804 he visited Pestalozzi at München-Buchsee, and on his return to Mecklenburg collected a company of boys, whom he taught two hours a day, instructing the teachers also in Pestalozzi's method. In 1805 he was appointed justice and consistory councillor by the duke of Oldenburg, and there renewed his teaching, to the dissatisfaction of the duke. Resigning his place, he gave himself up wholly to the business of teaching, visiting Pestalozzi again, and for a time becoming a teacher in his school at Yverdun, and subsequently establishing a school of his own at the castle of Vevay, on the lake of Geneva. In 1814 he disposed of this, and in 1815 was appointed royal and school councillor by the Prussian government, first at Frankfort-on-the-Oder, and afterward at Potsdam. Here he labored zealously to introduce Pestalozzi's method into Prussia, and with great success. He also introduced the culture of the mulberry and the raising of silkworms, and invented machines for reeling silk from the cocoons. In 1833 he resigned his post (the king granting him his full salary as a pension), to superintend the institutions he had founded. These were, a swimming school at Potsdam; an association for the improvement of silk-growing; a fund for school teachers' widows, to which he devoted the profits of some of his works; a society at Potsdam for the support of poor young men devoted to the arts and sciences; three orphan houses, one for boys and another for girls, orphans of government officers and teachers of the higher grades who were left destitute, and a third for the orphan children of artisans and teachers and officers of lower grades; and a soup distribution institution, for the old, sick, feeble, poor, and lying-in women. To these institutions he gave not only the profits of his published works, and the receipts from the sale of his gallery of paintings, but the greater part of his property and the proceeds of his autobiography, which he directed should be published after his death for their benefit. Von Türk's works are: "Letters from München-Buchsee" (Leipsic, 1808), an account of Pestalozzi's method; *Die sinnlichen Wahrnehmungen* ("Perception by the Senses," 1810); "Guide to Instruction in Arithmetic" (Frankfort, 1817), which is a valuable text book for teachers, and has passed through many editions; several essays on rearing silkworms and the growth of the mulberry; and his autobiography.

TURKEY (*meleagris*, Linn.), a well known gallinaceous bird, the type of the family *meleagrinæ*, which contains also the Guinea fowl (*numida*). The bill is moderate and strong, shorter than the head, compressed on the sides, with culmen arched, and upper mandible overhanging the lower; the cere is elongated into a loose, pendulous, round, fleshy caruncle; head and upper neck bare, with only a few scattered hairs, and carunculated; base of lower mandible sometimes wattled; a tuft of long, black bristles on the breast, largest in the males; wing short and rounded, the 1st 4 quills graduated, and the 5th and 6th the longest; tail broad and rounded, pendent during repose, but capable of being raised and extended like a fan; tarsi robust, longer than middle toe, covered in front with broad, divided scales, and armed with a short obtuse spur; anterior toes united at base by a membrane, the inner the shortest, the posterior moderate and elevated; claws short and slightly curved. All the species in the wild state are indigenous to North America. The common wild turkey (*M. gallopavo*, Linn.) is about 3½ feet long and 5 in extent of wings, weighing from 15 to 20 lbs., and sometimes more; the naked skin of the head and neck is livid blue, and the excrescences purplish red; the general color is copper bronze, with green and metallic reflections, each feather with a velvet-black margin; quills brown, closely barred with white; tail feathers chestnut, narrowly barred with black, and the tip with a very wide subterminal black bar; the female is smaller and less brilliant, without spurs, often without bristles on the breast, and with a smaller fleshy process above the base of the bill. It has a crop and gizzard, and an intestine 4 times the length of the body; the cartilaginous tissue of the stomach is less hard than in that of the common fowl. The full plumage is attained at the 3d year; the females usually weigh about 9 lbs. They fly in flocks of many hundreds, frequenting woods by day, feeding on acorns, all kinds of grain, buds, berries, fruits, nuts, grass, insects, and even young frogs; they make considerable journeys in search of food, flying and swimming across rivers of a mile in width; though able to reach with ease the tops of the highest trees, their flight is heavy, and would prevent their passage across any considerable expanse of ocean; they are so strong as not to be easily held when slightly wounded; they perch at night on trees. Quitting the woods in September, they come into the more open and cultivated districts, when they are killed in great numbers; they were formerly abundant in the middle, southern, and western states, but are now rare except in thinly settled regions, and have never been found west of the Rocky mountains. Benjamin Franklin thought the wild turkey should have been the emblem of the United States, being a truly indigenous and national bird; in his time the log cabin of the pioneer was surrounded by these birds, saluting each other in early morning from the tops of the forest trees, as the cottage of the European farmer is by chanticleer. Although exclusively an inhabitant of North America in its wild state, and introduced domesticated into the old world at a comparatively recent period, the earlier naturalists supposed it to be a native of Africa and the East Indies, and its common name is said to have arisen from the belief that it originated in Turkey; it was carried to England in the early part of the 16th century by William Strickland, the lieutenant to Sebastian Cabot in the voyages of discovery which he performed under the patronage of Henry VII. Since that time it has been acclimated in most parts of the world, and wherever known its flesh is highly esteemed; though the domestic bird has, contrary to the usual rule, degenerated in size, flavor, and beauty, it is everywhere regarded both by civilized and savage nations as the most delicious of the poultry tribe; Christmas in Europe and Thanksgiving day in the northern and middle United States would be bereft of one of their most pleasant associations by the absence of a turkey at the family dinner; 300 years ago, the turkey formed the usual Christmas fare of the English farmer's table; even the barbaric feasts of the South sea islanders in honor of distinguished strangers are often rendered semi-civilized by the presence of this bird. The flesh of the wild turkey is more pheasant-like than that of the domesticated varieties. The old males keep by themselves, as do the females and young, the former being apt to destroy the eggs in order to prolong the honeymoon; they are polygamous, the males in the breeding season, in March, strutting before the females, with tail spread and elevated, wings drooping, feathers ruffled, head and neck drawn back, emitting a puffing sound; the males also utter singular notes, resembling the word "gobble" several times repeated, whence the name gobbler often applied to them; they fight desperately for the possession of the females. The nest is a slight hollow in the ground filled with withered leaves, in a dry and sheltered situation, and usually contains, when full, 10 to 15 eggs; after this time the males conceal themselves in order to recover their condition; the females alone incubate, carefully concealing the nest, approaching it with great caution and always in a different way, covering the eggs with dry leaves when going in search of food, and bravely defending them against crows and other depredators; sometimes 3 or 4 females lay in one nest, one remaining to guard it while the others seek for food; after the young are hatched the males are attentive to them; the young run as soon as hatched, but are very tender and easily killed by cold and wet; the female calls her young by a well known cluck. They run very fast, and when pursued trust more to their legs than to their wings for escape; they are generally shot from their roosts at night, or entrapped in a pen or enclosure into which they are enticed by grain; their feathers are employed by the Indians in ornamental work; their greatest enemies are lynxes and owls, and other carnivorous mammals and birds.—The Honduras or ocellated turkey (*M. ocellata*, Cuv.), from Central America, is a much handsomer bird; the plumage is fine metallic green, passing to coppery, each of the tail feathers with 4 series of bluish green eye-like spots with copper-colored margin, and surrounded by a black ring; tail coverts tipped with white; there are only 14 tail feathers instead of 18, as in the preceding species. The Mexican turkey (*M. Mexicana*, Gould) resembles the domestic turkey more than does the *M. gallopavo*, in the white bars of the tail coverts and tail, but differs equally in the color and greater hairiness of the head and throat; it is of about the same size, the feathers of the sides of the body behind, the upper and under tail coverts, tipped with light brownish yellow or even whitish, and the rump with a greenish gloss; this is the *huaxolotl* of the Mexicans.—All the turkeys have the feathers broad, distinct, and scale-like. According to J. Gould, the *M. gallopavo* is a native of Mexico and the original of our domestic species, the common wild turkey being another nearly allied species, which he calls *M. fera;* the habits in all are the same, and all are timid and stupid birds. According to Major Le Conte, the domestic differs in many points of structure and habits from the wild turkey, the former having an enormous dewlap from the base of the lower mandible to the caruncles on the lower part of the neck; the color of the naked skin is of a fleshy tint, becoming in the male fiery red in the breeding season from turgidity of the caruncles, and is less hairy; the tail and its coverts are always edged with whitish; the wild turkey has never been so domesticated as to breed in captivity, notwithstanding the many efforts to accomplish it; it will, however, cross with the domestic bird, the progeny being hardier and more prolific, whether the wild parent be the father or the mother; the color of the cooked flesh in the wild bird is much darker. The hypothesis is suggested in vol. ix. of the Pacific railroad reports that there are 4 species of turkey: 1, the *M. ocellata* (Cuv.), from Central America; 2, the *M. Americana* (Bartr.), the common wild turkey; 3, the *M. Mexicana* (Gould), of Mexico and the table lands of the Rocky mountains; and 4, the *M. gallopavo* (Linn.), the domestic turkey, perhaps derived from a species indigenous to the West Indies, transported as tame to Mexico and other parts of America, and taken to Europe in the early part of the 16th century, the wild originals having been exterminated by the natives, as were the dodo and solitaire in the islands of the Pacific; this would account for the fact that no wild species closely resembles the domesticated turkey. This requires no description; they are found of almost every shade of color, the gray or gray and white varieties being most esteemed; the white breeds grow to a large size, and have a pure and tender meat, but the black and brown mixed are the hardiest. Turkeys are not generally regarded as so profitable for the small farmer as hens; they require more stimulating food to make them lay, and the young are easily killed by exposure to wet and extremes of heat and cold; they thrive best on high, dry, and sandy soil, and when grasshoppers are plentiful can pick up their own living; in temperate climates they generally lay twice a year, 15 eggs or less, white with small spots of reddish yellow. One male will suffice for 12 to 15 females, the latter being prolific for about 5 years, though those of 2 or 3 are the best hatchers; incubation lasts 27 or 28 days, and they are such close sitters that food must be placed within their reach; when they are raised on a large scale they are made to hatch in darkened places, and so that the turkey pouts, or young turkeys, shall all come out together; the young require warmth, shade, proper food, and pure water, and must be protected against rain and the hot sun; they are liable at all ages to many diseases, for the treatment of which special works in abundance can be consulted.

TURKEY (Turk. *Osmanli Vilayeti*), or The Ottoman Empire, an empire comprising large tracts of contiguous territory in Europe, Asia, and Africa. This territory may properly be divided into the immediate and mediate possessions of the sultan, the former being under pashas or governors appointed directly by the Sublime Porte (as the government is called), and the latter acknowledging his suzerainty and paying tribute, but governed by their own officers, whose selection however, to be valid, must be approved by the sultan. Among the mediate possessions may be reckoned Wallachia, Moldavia, Servia, and Montenegro in Europe, a considerable portion of Arabia in Asia, and Egypt, Nubia, Kordofan, Tunis, Tripoli, and Fezzan in Africa. The immediate possessions of the Turkish empire are bounded by Austria, Servia, the Danubian principalities, Russia in Europe, the Black sea, the Russian Transcaucasian provinces, Persia, the Persian gulf, Arabia, the Mediterranean, the Archipelago, Greece, the Ionian sea, the Adriatic, and Montenegro. The area of the empire is variously estimated. Dr. A. Petermann (1858) gives it as follows: Turkey in Europe, 203,484 sq. m.; Turkey in Asia, 668,992; Turkey in Africa, 955,357; total, 1,827,734. Johnston, in the new edition of his "Physical Atlas" (1861): Turkey in Europe, 197,625 sq. m.; Turkey in Asia, 508,800; Turkey in Africa, 626,000; total, 1,332,425. The political divisions of the country are so arbitrary and so constantly changing, that it is almost impossible to give any satisfactory statement in regard to them. The territory is divided into *eyalets* or pashalics, the chief magistrate of which bears the title of *vali* or governor-general; the eyalets into *sandjaks* or *livas* (provinces), which are governed by *kaimakams* or lieutenant-governors; the sandjaks into *casas* or districts; and the cazas into *nahiyes*, composed of villages and hamlets. According to the "Gotha Almanac" for 1862, the political divisions of the empire are as follows:

Turkey in Europe (15 eyalets, 43 sandjaks, and 376 cazas):

Eyalets or pashalics.	Capitals.
Adrianople (Thrace)	Adrianople.
Silistria (eastern Bulgaria)	Silistria.
Moldavia*	Jassy.
Wallachia*	Bucharest.
Widin (western Bulgaria)	Widin.
Nissa	Nissa.
Uskup (eastern Albania)	Uskup.
Servia*	Belgrade.
The fortress of Belgrade	.:..
Bosnia (including Turkish Croatia and the Herzegovina)	Bosna Serai.
Roumelia (western Albania, Montenegro,* and northern Macedonia)	Monastir.
Janina (Epirus)	Janina.
Salonica (southern Macedonia and Thessaly)	Salonica.
Jezair (the islands of the archipelago)	Rhodes.
Candia or Crete	Candia.

Turkey in Asia (22 eyalets, 78 sandjaks, and 858 cazas).

Eyalets.	Capitals.
Kastamuni (Paphlagonia)	Kastamuni.
Khudavendigiar (Bithynia)	Broussa.
Aydin (Lydia)	Smyrna.
Caramania (Phrygia and Pamphylia)	Konieh.
Adana (Cilicia)	Adana.
Bozok (western Cappadocia)	Yuzgat.
Sivas (eastern Cappadocia)	Sivas.
Trebizond (Pontus and Colchis)	Trebizond.
Erzroum (Armenia)	Erzroum.
Van (Assyria)	Van.
Koordistan	Diarbekir.
Kharpoot (Sophene and Commagene)	Kharpoot.
Aleppo (Syria)	Aleppo.
Saida (Phœnicia and Palestine)	Beyrout.
Lebanon	Deir-el-Kamr.
Esh-Sham (Damascus)	Damascus.
Schehrzor (Mesopotamia)	Schehrzor.
Bagdad (Babylonia)	Bagdad.
Mecca	Mecca.
Habesh (Arabia and Ethiopia)	Jiddah.
Haremi-Nebevi	Medina.
Yemen	Mocha.

Turkey in Africa (3 eyalets).

Eyalets.	Capitals.
Egypt	Cairo.
Tripoli	Tripoli.
Tunis	Tunis.

(For African Turkey, see Egypt, Nubia, Tripoli, Tunis, &c.) The largest cities of European Turkey are Constantinople, Adrianople, Salonica, Bucharest, and Sophia, all of them having over 50,000, and two over 100,000 inhabitants; beside which there are 22 towns having a population between 20,000 and 50,000, and 18 between 10,000 and 20,000. Asiatic Turkey has two cities, Smyrna and Damascus, with a population above 100,000; Scutari, Broussa, Afioom, Aleppo, Kutaieh, Bagdad, and Bassorah have each over 50,000; 17 other towns have between 20,000 and 50,000, and 27 between 10,000 and 20,000. There has been no complete census of the Turkish empire since 1846, and its population is variously stated. Dr. Petermann estimated it in 1858 as follows: European Turkey, 15,500,000; Asiatic, 16,050,000; African, 5,050,000; total, 36,600,000. Keith Johnston in his "Physical Atlas" of 1861: European Turkey, 15,500,000; Asiatic, 16,050,000; African, 8,695,000; total, 40,245,000. Others still estimate the population of European Turkey at 16,440,000. The adherents to different religions among the inhabitants of European and Asiatic Turkey were estimated as follows by Dr. Kolb in 1860:

Religion.	European Turkey.	Asiatic Turkey.	Total.
Mussulmans	4,550,000	12,650,000	17,200,000
Greeks and Armenians	10,000,000	800,000	10,800,000
Roman Catholics	640,000	....	640,000
United Greeks and Armenians	....	100,000	100,000
Syrians and other minor sects	....	20,000	20,000
Maronites	....	140,000	140,000
Jews	70,000	80,000	150,000
Total	15,260,000	13,290,000	28,550,000

Beside these, there are the gypsies, the Druses, the Yezidis, the Metawalis, the Nestorians, and several other sects, numbering in all about 3,000,000.—Turkey in Europe has a coast line of upward of 1,300 m., of which about 200 are washed by the Adriatic, 100 by the Ionian sea, 600 by the Ægean, and 400 by the Black sea. The harbors on the Adriatic are poor, but many of the others are excellent. The coast line of Asiatic Turkey has not been accurately measured, but it cannot fall short of 3,000 m., embracing the Mediterranean (including the archipelago or Ægean sea) from the Dardanelles to the boundary of Egypt, the Black sea from the Bosporus to St. Nicolai, and the sea of Marmora from the Dardanelles to Constantinople. African Turkey has a coast line on the Mediterranean from Cape Rosa to El Arish, and along the whole western side of the Red sea from Suez to Cape Bab-el-Mandeb. Arabia, which also may be reckoned as partly belonging to the empire, has the E. shore of the Red sea and the Persian gulf for its sea borders. This vast extent of coast embraces many of the best harbors in the world. It is indented by numerous gulfs and bays, of which the principal are the gulfs of Drin, Avlona, Arta, Salonica, Cassandra, Monte Santo, Enos, Saros, and Boorghas in Europe; Adramyti, Smyrna, Scala Nova, Cos, Makri, Adalia, Scanderoon, and the Persian gulf in Asia; and the gulfs of Sidra, Cabes, and Suez in Africa. There are but few lakes in European Turkey, but in Turkey in Asia there are many of considerable size; the largest and best known are Lake Van in Armenia; Isnik, Abullionte, Maniyas, Egerdir, Tuz, and Kerely in Asia Minor; Bahr-el-Merdj near Damascus; and Bahr-el-Huleh, the lake of Tiberias, and the Dead sea in Palestine. Most of these are salt, and have no outlet. The rivers of Turkey in Europe may be classed under 3 heads: those flowing respectively into the Adriatic and Ionian seas, into the Ægean, and into the Black sea. The first class are usually small, rising near the coast range of mountains; the Narenta, Drin, and Voyutza are the principal. The second class are larger, the Salembria, Vardar, Karasu, Struma, and Maritza being the most important. In the last class, those flowing into the Black sea, are the Danube and many of its most important tributaries, especially the Pruth, Sereth, Jalomitza, Aluta, Isker, Shyl, Morava, and Save. The rivers of Asiatic Turkey may be arranged in 5 classes: those flowing into the Black sea, the Mediterranean, the Red sea, and the Persian gulf, and the Jordan with its tributaries, flowing into the Dead sea. The principal rivers flowing into the Black sea are the Tchoruk, Yeshil-Irmak, Kizil-Irmak, and Sakaria. Those discharging into the Mediterranean are mostly small, though some of them are connected with important events in ancient history; the most important are the Koduz, Mendere, Syhoon, Jyhoon, Nahr-el-Asi or Orontes, Kasimieh or Leontes, Mukutta or Kishon, and Assuf or Kanah. The streams falling into the Red sea on its E. side are all small and unworthy of notice; but among those flowing into the Persian gulf are the Euphrates and Tigris with their numerous tributaries.—The greater part of the islands of the Grecian archipelago, and those of the sea of Marmora, as well as the larger islands of Crete or Candia, Rhodes, and Cyprus, belong to the Turkish empire.—There are 3 principal mountain ranges in European Turkey, which form the great watersheds between the different basins of the country; they are: 1. The Illyrico-Hellenic or western range, comprising the Dinaric Alps, a continuation of the Julian Alps, which separate the Adriatic coast from the basin of the Save, and having its culminating point in Mount Dinara, 7,458 feet high, and the Pindic chain, connected on the N. with the preceding, separating western Albania and Epirus from Macedonia and Thessaly, uniting with the Olympian chain on the S., and forming the watershed between the Ionian and Ægæan seas; Mt. Ida in Candia seems to be a continuation of this chain. Its principal summits are Mts. Olympus, Metzovo, Ida, Ossa, Othrys, and Pelion. 2. The Balkan or Mt. Hæmus range, branching off from the preceding range N. E. of Albania, dividing Macedonia and Thrace from Bulgaria, and terminating in Cape Emineh on the Black sea. It consists of two main branches: the Balkan proper, which has 3 principal summits, the Great Balkan, the Emineh Dagh, and the Tchan Dagh; and the Despoto Dagh chain in the W. of Thrace, whose chief summits are the Relo Dagh and Mt. Athos, or Monte Santo. 3. The south-eastern Carpathians, forming the watershed between the Theiss and the lower Danube. This range lies mainly in Austria. The principal passes of these ranges are Trajan's gate and the Shumla pass in the Balkan; the Vulcan, Red Tower, Roman, Bodza, Oitoz, and Gyimes passes in the Carpathians, between Wallachia and Moldavia and Transylvania. The mountain system of Asiatic Turkey is composed of the two nearly parallel ranges, Taurus and Anti-Taurus, which form the connecting link between the Balkan and the mountain systems of Syria, Caucasia, and Persia; and the Lebanon range, proceeding southward from Taurus in the province of Marash, and extending parallel with the coast of Syria to Mt. Hermon in the north of Palestine, a summit rising above 10,000 feet, and thence at a lower elevation through Palestine to the Sinaitic peninsula, where it terminates on the shore of the Red sea.—The surface of European Turkey is undulating, and sometimes mountainous, but with a large proportion of arable land of moderate elevation. A considerable part of Asiatic Turkey consists of elevated plateaus, many of them scantily watered, while in other regions once very fertile, but consisting of steep and precipitous hills and narrow valleys, the sands of the desert have covered the soil and rendered the country barren. The plains are generally desert from want of irrigation; and though the slopes of the mountains afford fine pasturage, the frequent raids of Bedouins and Koords materially diminish the amount of production. That part of European Turkey bounded by the Balkan, Mt. Pindus, and the basin of the Maritza, together with the N. part of the Dobrodja, and a tract S. of the gulf of Boorghas, is covered with primitive rocks; secondary strata occur in the western provinces, and N. of the Balkan from the Morava to the Black sea; the tertiary formations predominate throughout the basin of the Save and Maritza, and in the S. W. of Albania. There are several small tracts of the upper palæozoic N. W. of Constantinople, in the Balkan, and on the Danube near Orsova. The geology of Asiatic Turkey has been but imperfectly explored, but so far as known it corresponds to that of European Turkey, with perhaps less of the tertiary formations. The soil of European Turkey is for the most part very fertile, yielding large returns to the husbandman; but in past times the oppressive system of farming the taxes did much to prevent agricultural improvement, and the soil is tilled in the most primitive method. In Asiatic Turkey there is a deficiency of moisture, and many tracts once yielding most bountiful crops are now, from want of irrigation, reduced to the condition of sandy deserts. This is particularly the case with considerable districts of Palestine and other portions of Syria.—Turkey in Europe is subject to violent climatic changes. Owing to the elevation of considerable portions and to the cold N. E. winds from the interior of Russia, the winter is in many parts excessively cold, the thermometer descending in the plains of Wallachia and Moldavia to 15° below zero; and at the mouth of the Danube the winter temperature is the same as in the interior of Iceland. Around Constantinople the temperature of winter and spring is very variable, snow and hard frost alternating with mild weather, and a change of 30° in a single night is not uncommon. Albania, which is sheltered from the N. E. winds by mountains, has a more uniform climate, but is subject to earthquakes. In summer the rocky districts of the interior and the valleys of the W. which look seaward are insupportably hot. At Constantinople the mean temperature of the year is 56.3°, of the winter 40.3°, and of the summer 71.2°. The average fall of rain for the year over the entire peninsula does not exceed 32 inches. The climate of Asiatic Turkey varies little from that of the European portion of the empire. It is cold and humid in the mountainous regions in the winter months, but in the sheltered valleys and plains it is warm and delightful. The summer heats are excessive, especially in the valleys. The valley of the Jordan and the tract watered by the Euphrates and Tigris are intolerably hot and dry in summer. Little or no rain falls from April to the middle of September, but the night dews are heavy. The peaks of Mt. Ararat and of the higher summits of the Lebanon and Taurus ranges are covered with perpetual snow. The mean annual temperature at Jerusalem is 62.6°, that of summer 73.8°, and that of winter 49.6°.—In European Turkey no coal has been found, but iron of the best quality is abundant. Argentiferous lead ore exists in considerable quantities; copper, sulphur, salt, alum, and a little gold are found. In Asiatic Turkey, there are copper, lead, alum, silver, rock salt, and mineral waters in Armenia; in Asia Minor, all these and considerable quantities of nitre; in Syria, iron, coal, and limestone, and west of the Jordan indurated chalk.—The chief botanical characteristic of both European and Asiatic Turkey is the predominance of the *labiatæ*, *caryophyllaceæ*, *ericaceæ* or heaths, of the evergreens belonging to the *coniferæ*, and of the amentaceous trees common to the south of Europe. In the basin of the Danube the pine, beech, oak, lime, and ash are the principal forest trees, and the apple, pear, cherry, and apricot the most common fruit trees. In the provinces S. of the Balkan these trees are only found on the slopes of the mountains, while on the lower lands the palm, maple, almond, sycamore, walnut, chestnut, and carob trees, and the box, myrtle, laurel, and other evergreens, are found; in Bosnia and Croatia there are large forests of fir and pine; the maritime plains of Albania are favorable to the growth of the olive, orange, citron, and vine, as well as to the peach, plum, and numerous other fruit trees; and the plain of Adrianople, as well as most of the region S. of the Balkan, abounds in roses, from which the attar is largely distilled. Of agricultural products, maize is cultivated in the south, rice, cotton, rye, and barley in the central provinces, and wheat, barley, and millet in the north. Though producing forest trees of the same families with those of European Turkey, the predominant trees of Asiatic Turkey are of different genera. The cedar, cypress, and evergreen oak crown the lower summits and thrive on the slopes of Lebanon and Taurus; the sycamore and mulberry occupy the lower hills, and the olive, fig, citron, orange, pomegranate, and vine flourish luxuriantly in the lowlands. Mesopotamia abounds in dates, and in wheat, barley, rice, maize, tobacco, hemp, flax, and cotton.—The wild animals of European Turkey are the wild boar, bear, badger, marten, wolf, wild dog, fox, civet, wild cat, 22 species of bat, squirrel, beaver, hedgehog, mole, mouse, rat, several species of hare, the fallow deer, the roe, antelope, chamois, and wild ox. The lion, formerly an inhabitant of Mt. Olympus, is extirpated. Of birds 259 species have been counted, of which 31 are birds of prey, 100 songsters, 12 gallinaceous birds, 15 climbers, 64 waders, and 37 swimmers. Game is plentiful, especially in the mountains. Fish are numerous, embracing all the known species of the Mediterranean; tunny, coral, and sponge fisheries are extensively prosecuted; trout and other fish abound in the rivers, and the collection of leeches from the marshes is an important trade. In Asiatic Turkey, the lion is still found E. of the Euphrates; the striped hyæna, lynx, panther, buffalo, wild boar, and wild ass occur in Mesopotamia; the bear, wolf, wild hog, and jackal in Asia Minor; while the leopard, hedgehog, jerboa, hare, mole, and wolf are found throughout Syria, and the Syrian bear on Mt. Lebanon. The camel, dromedary, horse of the best breeds, ass, ox, sheep, and goat are the principal domestic animals. Of the two last there are several peculiar varieties. The Angora goat, celebrated for the fineness of its hair, and the broad-tailed sheep are specially noticeable. The birds, fishes, and reptiles differ little from those of Turkey in Europe.—Perhaps no country in the world is inhabited by so great a variety of races as the Turkish empire. The Turks are divided into two races: the Osmanlis, or Turks proper, the ruling race, whose numbers are estimated at about 3,000,000 in European and 10,500,000 in Asiatic Turkey; and the Toorkomans, who are principally found in northern Mesopotamia and adjoining districts, and do not probably exceed 100,000. The Greeks are about equally divided between the European and Asiatic divisions, and number in all somewhat more than 2,000,000. The Armenians are about 500,000 in European and 2,000,000 in Asiatic Turkey. The Slavic races, under which term are principally included the Bulgarians, Servians, Bosnians, Herzegovinians, and Montenegrins, number about 6,000,000, and are all in European Turkey. The Roumans or Wallachs, a Daco-Roman race, inhabiting chiefly the Danubian principalities, number about 4,000,000. Beside these there are upward of 1,000,000 Arnauts or Albanians proper in the province called after them; not far from 1,000,000 Arabs in Asiatic Turkey, and about 4,000,000 in the African Turkish possessions; about 240,000 Syrians, all in Asiatic Turkey; about 200,000 Jews, 90,000 Franks or western Christians, 1,000,000 or more Koords, 220,000 gypsies, 30,000 to 50,000 Druses, about the same number of Tartars, and large numbers of Circassians and other Caucasians; and in Africa, Copts, Nubians, Berbers, &c. The Osmanlis are in general a robust, well formed race, with a grave and commanding countenance. They are intelligent and capable of readily acquiring knowledge, generally courteous and hospitable to strangers, constant in their friendships, but given to dissimulation, indolent, bigoted, licentious, and deficient in tender emotions. They are almost universally fatalists. The Osmanli is too indolent to engage willingly in severe labor. He is exempted from the capitation tax which the other races are compelled to pay; he sometimes condescends to engage in trade, though no match for the sharp Greek or the wily Armenian, but, unless in a very abject condition, avoids agricultural or mechanical pursuits. The Toorkomans and Koords are shepherds and herdsmen, often migratory, but sometimes occupying villages and cultivating the soil. They are more industrious than the Osmanlis. The Slavic races, the Roumans, and the Albanians are the principal agriculturists in European, and the Armenians, Syrians, and Druses, with some of the Osmanlis, in Asiatic Turkey.—Agriculture is in a low state, and the implements and culture are of the rudest description, the former being almost universally of the same form as those in use 3,000 years ago. Notwithstanding this imperfect cultivation, the crops of grain, rice, cotton, tobacco, &c., owing to the fertility of the soil, are very large, yielding from 25 to 100 fold return. The olive is largely cultivated for food and for oil, and the grape, fig, date, orange, and citron yield abundant and profitable returns. The manufactures of the Turkish empire are comparatively few and simple. Wax, raisins, dried figs, fig paste, olive oil, silks, red cloth, goat-skin morocco of excellent quality, saddlery, swords of superior workmanship, firearms, copper and tin utensils, shawls, carpets, dye stuffs, embroidery, essential oils, attar of roses, brandy from prunes, &c., are the principal. Its commerce is extensive and on the increase. The exports are principally raw materials, silk, cotton, tobacco, wheat, maize, wool, goats' hair, meerschaum clay, wax, honey, and sponges; drugs and dye stuffs, opium, madder, gall nuts, gum arabic, valonia, and various gum resins; figs, currants, raisins, wines, olive oil, &c., with some carpets and red cloths. The imports are manufactured goods of all kinds, glass, pottery, arms, paper, cutlery, steel, amber, &c. The value of the entire imports of the empire cannot be ascertained, but in 1860 there were imported into the 3 ports of Constantinople, Smyrna, and Trebizond foreign goods to the value of $75,502,817. The exports are much less. Of this trade Great Britain has the largest share, exporting to Turkey in 1858 about $50,000,000 worth, and receiving from that country about $39,000,000. In 1847 the imports from Great Britain at Constantinople and Smyrna alone exceeded $47,000,000. The exports from Turkey to the United States in 1860 were $1,041,959, and the imports about $420,000. With the exception of a few of the great thoroughfares, there are really no roads worthy of the name throughout the empire. Two railways have recently been constructed (1862), one from Smyrna to Aidin, to be completed to the promontory opposite Samos, and the other from Rassova on the Danube to Kustendji on the Black sea. Several others have been projected. The Danube with its navigable tributaries forms the great channel of commerce for the northern provinces of European Turkey.—Education has been hitherto very greatly neglected, but there is now a deep interest taken in intellectual culture, since it is the only avenue to many kinds of employment. In 1847 the system of public instruction was entirely remodelled. There are now elementary schools for reading, writing, arithmetic, and religious instruction; middle schools, in which Arabic composition and Mohammedan religious history are taught; and colleges for higher branches, such as medicine, agriculture, and naval and military science. The instruction in these is gratuitous, and parents are required to send their children to school on attaining the age of 6 years. Wealthy Osmanlis often send their children to Paris to be educated. The Christian (Greek, Roman Catholic, and Armenian) sects have some schools of their own, but there is very little thorough education in the empire. There are now 4 newspapers in the Turkish language, 2 in Greek, 2 in French, and one each in English, Armenian, Bulgarian, Arabic, and Hebrew, beside several Rouman and Servian newspapers published in the tributary provinces. The state religion is the Mohammedan, but Christian, Jewish, and other sects are recognized, and permitted to conduct their worship in their own way. Previous to 1856 a Mohammedan who became a Christian or Jew, if of Turkish birth, was liable to be put to death; but by a *hatti-sherif* or decree of that year the sultan abolished this penalty, and gave all persons of whatever birth equal rights and justice, and liberty to embrace whatever religion they chose. This *hatti-sherif*, or *hatti-humayum* as it is sometimes called, has been strictly enforced in those pashalics under the immediate government of the sultan, but in the remoter provinces and among the more bigoted Mohammedans it has remained virtually a dead letter.—The government of Turkey is a pure despotism, or absolute monarchy. The emperor has the titles of sultan, padishah, grand seignior, khan, and hunkiar. Though professedly absolute, his power is practically very much limited by the sheik ul-Islam, who is at the head of the combined religious and judicial order of the nation called the chain of the ulema, composed of the ministers of religion and justice, and has the right of objecting to any decree of the sultan. The first executive officer of the government is the grand vizier, who is the vicegerent of the sovereign, and is usually called *sadri azam* (great president). The other officers composing the cabinet or divan are the presidents of the supreme council of state (the *ahkiami adlié*) and the grand council of internal affairs (the *tansimat*); the *seraskier*, who is commander-in-chief and minister of war; the *capudan pasha*, or high admiral; the *malliyé*

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* Partially independent.

nasiri, or minister of finance; the *kharidshishié nasiri* (formerly *reis effendi*), the minister for foreign affairs; the *marif nasiri*, or minister of public instruction; the *sarbhani mushiri*, master of the mint; the *tidjaret nasiri*, or minister of commerce; the *daava nasiri*, or minister of justice; the *efkaf nasiri*, administrator of mosque property and charitable trusts; and the *sabtishié mushiri*, or minister of police. The governors-general (*valis*) of the eyalets or pashalics receive a salary of $8,000 per month, and the *kaimakams* or governors of sandjaks less sums according to their rank. The fixed revenues of the pashalics are not now farmed out as formerly, but are collected through *defterdars* or receivers-general in each pashalic, in the same way as in other civilized countries. The variable imposts are farmed, but the power of the farmers to oppress those from whom the impost is to be collected is much restricted. The mushirs and kaimakams are appointed by the tanzimat on the nomination of the sultan, and are removable at the sultan's pleasure. They no longer possess the power of life and death. The Koran being the supreme authority in law as well as religion, the law officers, who must all be Osmanlis, form a part of the chain of the ulema, and receive the same training as the ministers of religion; they rise through 10 degrees, from that of imam to that of grand mufti. The receipts of the imperial treasury, for the year ending Oct. 1861, were $57,220,000, and the government expenditure for the same period $67,045,000. The public debt, Sept. 13, 1861, was of two classes: the home debt, amounting to $92,292,000, and the foreign debt, of $165,762,000. The interest on this debt absorbs 16 per cent. of the annual revenue. The army of the empire is divided into the *nisam* or permanent force, and the *redif* or reserve. The effective or permanent force is nominally 180,000 men, but really does not exceed 120,000, divided into 6 army corps (*ordus*), each under the command of a *mushir* or field marshal, who must be a *ferik pasha*, or of equal rank with the governor of an eyalet. These corps are severally composed of 2 divisions, having each 3 regiments of infantry, 2 of cavalry, and 1 of artillery. The reserve is also composed of 6 corps, each commanded by a marshal of the rank of a *liva pasha*, or governor of a *liva* or sandjak. The number of men enrolled in the reserve is variously stated at from 126,000 to 300,000. Beside these there are 4 detached divisions: the army of Candia, of 1,000 men; the army of Tripoli, 5,000; that of Tunis, 5,000; and the central division of artillery, comprising about 30,000. Bosnia and Albania, in case of invasion, are bound to furnish each 30,000 men, Servia 40,000, and Egypt 18,000, making in all 118,000 levies from these states. The navy consists nominally of 8 ships of the line, 12 frigates, 4 corvettes, 8 brigs, 9 schooners, and 23 steamers. Of these, 18 steamers, 2 ships of the line, 5 frigates, 6 corvettes, and 5 brigs, carrying in all 1,218 cannon, and having 34,000 marines and sailors, are fit for effective service.—The Turkish empire in Europe dates only from the overthrow of the Byzantine empire in the 15th century; but the Osmanlis had already become a formidable power, and the masters of the greater part of Asiatic Turkey, in the early years of the 14th century. (See TURKS.) In 1299 Othman or Osman (from whom are derived the names Ottoman and Osmanli) invaded Bithynia, and occupied the territory of Nicæa. In 1326 his son Orchan took Prusa (Broussa), the capital of Bithynia, and subsequently penetrated into Thrace. His son Murad or Amurath I. subdued the whole of Thrace, in 1362 established from his young captives the military band known as janizaries, and subsequently conquered the Bulgarians, Servians, Bosnians, and Albanians, and fell on the battle field of Kossovo in 1389. He was succeeded by his son Bajazet or Bayazid, surnamed Ilderim (the lightning), who completed the conquest of Asia Minor, of a portion of Thrace which had revolted, and of Macedonia and Thessaly, overran central Greece, and conquered in the great battle of Nicopolis, but was defeated and taken prisoner by Tamerlane in 1402. In 1422 the sons of Bajazet, who had contended with each other for the government, which they had wrested from Tamerlane's successors, had all deceased, and Amurath II., the grandson of Bajazet, succeeded to an undivided empire, which he greatly increased by the recapture of Adrianople, and the reduction of Roumelia, Servia, Albania, and the whole of Greece north of the isthmus. For a time Scanderbeg, the Albanian chief, and Hunyady, the waywode of Transylvania, were successful in checking his conquests; but the severe defeat of Ladislas, king of Hungary and Poland, at Varna (1444), effectually destroyed the hopes of the Christian world. Amurath II. was succeeded in 1451 by Mohammed II., who in 1453 took Constantinople, and established the Osmanli throne on the ruins of the palace of the Roman emperors. He next attempted the siege of Belgrade, but was repulsed with heavy loss by Hunyady, and, turning his attention to Greece, reduced the whole Morea to subjection; he subsequently reduced Trebizond, and in 1466, having driven Scanderbeg into Lissa, then belonging to the Venetians, reigned supreme over all the eastern provinces of the Roman empire in Europe, and the whole of Asia Minor. His grandson Selim I. (1512–'20), the son of Bajazet II., was victorious over the Persians, and reduced Koordistan, Syria, Egypt, and a part of Arabia. His son, Solyman the Magnificent (1520–'66), made conquests on every side, successively reducing Belgrade and the island of Rhodes, Hungary, Armenia, Irak, Tunis and Algiers, Croatia, Yemen, Shirvan, Georgia, and Transylvania. Moldavia was made tributary. Selim II., his son, conquered Cyprus, but lost the great naval battle of Lepanto (1571). From that time a weaker race of princes succeeded to the throne, and the janizaries gained a degree of power which made them for the most part the actual rulers of the country. (For the reigns of the most important sultans of this period, see AMURATH III. and IV., MOHAMMED IV., ACHMET III., MAHMOUD I., and ABDUL HAMET.) Frequent wars with Poland, Austria, Persia, Venice, and Russia were waged, mostly under the lead of the grand viziers, and but rarely with success. Montecuculi, Sobieski, Louis of Baden, and Prince Eugene destroyed the Turkish power on the Danube; and at the peace of Carlowitz in 1699 Mustapha II. surrendered almost all the Hungarian provinces to Austria, Azof to Peter the Great of Russia, Podolia and Ukraine to Poland, and the Morea and Dalmatia to Venice. During almost the whole of the 18th century Turkey was at war, with brief intervals of peace or truce, with Russia, and much of the time with Austria also. Though occasionally successful, this protracted warfare was on the whole exceedingly disastrous to Turkey, causing her the loss of the Crimea and all her possessions N. of the Black sea, and of the exclusive navigation of that sea and the straits connected with it. In other quarters, too, losses were suffered. The reign of Selim III. (1789 to 1807), though characterized by enlightened reforms and great ability, was one in which disaster still followed the empire. By the peace of Jassy (1792) the Dniester was made the frontier between Russia and Turkey. Several of the pashas aspired to independence, and the conquest of Egypt by Bonaparte led to a war with France, which ended in considerable concessions to that power; and wars with Russia and England and the rebellion of the janizaries made the condition of Turkey more perilous than ever before. Selim was deposed in 1807, at the instance of the janizaries and the grand mufti, in consequence of the reforms he had introduced. The one year's reign of Mustapha IV., who restored the ancient *régime*, was followed in 1808 by the vigorous administration of Mahmoud II. Introducing more radical reforms than any of his predecessors, concluding peace with England in 1809 and Russia in 1812, not without considerable sacrifice of territory, and ridding himself by a terrible slaughter of the janizaries, he was in a position to rule successfully and with advantage to his empire; but the revolution of the Greeks and the insurrection of Mehemet Ali in Egypt involved him in new and still greater difficulties. Greece achieved her independence at an almost fatal cost to Turkey. The revolted pasha of Egypt had also substantially attained to an independent position, when in 1840 the great powers of Europe, with the exception of France, deeming the adherence of Egypt to Turkey necessary to the maintenance of the balance of power in Europe, reduced him to the condition of a tributary. On the death of Mahmoud in 1839, his son Abdul Medjid, then but 16 years of age, ascended the throne. In July, 1841, the great powers of Europe guaranteed the integrity of the Turkish empire, the result of which was the consolidation and strengthening of the empire, and the suppression of most of the chronic difficulties and revolts which had so long impaired the efficiency of its government. The revolutions of 1848 did not disturb Turkey, except in the principalities of Wallachia and Moldavia, which were tributaries rather than provinces. The sultan introduced numerous reforms; among others, the decree known as the *hatti-sherif* already referred to, first promulgated in 1839, and confirmed at the close of the Crimean war in 1856. The claims of the czar Nicholas to a protectorate over the Christian subjects of the sultan, led to a declaration of war against Russia in Oct. 1853, in which England, France, and Sardinia subsequently joined. (See CRIMEA.) As a result of this war, in the early part of which the Turkish forces under Omer Pasha distinguished themselves, the access to the mouth of the Danube and the territory around it were ceded to Turkey, and Russia was forbidden to maintain any considerable fleet in the Black sea, or to attempt the exercise of authority over the subjects of the Porte. The Crimean war was followed, as it was preceded, by considerable troubles with the small semi-independent state of Montenegro. In June, 1858, fanatic Mohammedans at Jiddah massacred the British and French consuls; the town was bombarded by a British man-of-war, and subsequently a part of the criminals were discovered and executed. In Sept. 1859, a conspiracy was discovered, having for its purpose the assassination of the sultan and his principal ministers and the restoration of the ancient customs; the principal movers in it were arrested and condemned to perpetual imprisonment in a fortress. In June, 1860, a war broke out between the Druses and Maronites in Syria, and many thousands of both races were massacred. The interposition of France and England led to the adoption of rigorous measures for its suppression, which was accomplished in the autumn of the same year. On June 25, 1861, Abdul Medjid died, and was succeeded by his brother Abdul Aziz, who has commenced a decided retrenchment of the expenses of the government, and gives promise of being a more efficient ruler than his predecessor. This new reign, however, is already troubled by a renewed conflict with Montenegro, which on the part of the Turks is carried on, with varying success, under the command of Omer Pasha.

TURKEY BUZZARD, the popular name of one of the common American vultures, *cathartes aura* (Illig.). It is about 2½ feet long and 6 in extent of wings; the bill, as in the other species of the genus (which includes the black vulture or carrion crow and the great California vulture), is long and comparatively slender, with an arched, strong tip; a large soft cere, ⅓ of the length of the bill, in which the pervious nostrils are placed; wings long and pointed, the 3d and 4th quills nearly equal and longest; tail moderate and nearly even; tarsi short, plumed below the knee, and with small scales;

toes weak, united by a small membrane, hind one short and weak, and claws strong; head and neck naked, no fleshy crest, and the plumage black. All the vultures which have the nostrils perforated belong to the new world; this genus is one of the sub-family *sarcoramphinæ* or condors. The color is brownish black, with a purplish lustre, darkest on the back and upper part of tail, and some pale edgings; bill yellowish; head and neck bright red, with a few scattered hair-like feathers and wrinkled skin; plumage commencing on the neck with a circular ruff of prominent feathers. It is found all over North America, except the arctic regions, going on the Pacific coast as far N. as the British possessions, but on the Atlantic rarely seen N. of New Jersey; but it is most abundant in the southern states, migrating thither from the colder parts. It is essentially a carrion eater, though it will devour any kind of fresh meat, and even small living mammals, birds, and reptiles; it has been known to attack and kill weak and sickly animals in the fields. It associates in flocks of 25 to 30, even when not feeding, becoming very familiar in the southern cities, where it performs a very useful scavenger's work in devouring any carrion or animal filth left in the streets; it is called John Crow vulture in Jamaica, and gallinazo in many places in the S. W. portions of North America. It finds out its prey at a great distance by the acute sense of sight, like other vultures; its flight is lofty, and uncommonly graceful and long sustained, sailing for miles without apparent effort, with the tips of the wings bent upward by the weight of the body; it is often seen in company with the black vulture, hawks, kites, and crows; it is also a good walker on the ground. Its average weight is 6¼ lbs., which is somewhat less than that of the black vulture; it is also less common than the latter bird, more retired in its habits, and, though more inclined to carrion, neater, better formed, and a more rapid and elegant flier. It is fond of particular roosting places, generally high and dead cypresses in deep swamps; it drinks freely, immersing the bill to the base and taking long draughts; it is very sensitive to cold, and liable to disease about the eyes and legs in the shape of warts and excrescences; when alarmed or provoked it utters a loud hissing noise. In the southern states the breeding season begins early in February, the nest being usually placed in the hollow of a dead tree, or, it is said, even on the ground, and containing 2 eggs, 2⅞ by 2 inches, light cream-colored, with irregular black and brown marks; both birds incubate, each feeding the other and the young with the disgorged contents of the stomach; incubation lasts 32 days, and only one brood is raised in a season; the nests become extremely dirty and fetid.

TURKISH LANGUAGE AND LITERATURE. The languages spoken by the different tribes of Turkish or Tartar origin form a principal division of the great Scythian, Altaic, or Turanian family, of which the chief common characteristics have been pointed out under TURANIAN RACE AND LANGUAGES. They constitute together a well marked group of nearly related idioms; even the Yakoot—the one which differs most from the rest, and is supposed to have severed itself from the main stem before the division of the latter into its other branches—is so distinctly a Turkish language that its relationship is apparent upon the most superficial examination; and it has been asserted, although doubtless without good reason, that a Yakoot from the Lena could make himself passably understood at Constantinople. The Tartar dialects are for the most part known only by scanty vocabularies and the descriptions of travellers; a few have been treated grammatically; three or four, as the Uigur, the Jagatai or oriental Turkish, and the Osmanli, have received literary culture, and are to be studied in written monuments. Of these last, the dialect of the tribe which has been during the past 500 years dominant in European and Asiatic Turkey, or the Osmanli Turkish, as it is distinctively called, is of by far the greatest importance, and to it we shall chiefly direct our attention. Its peculiarities are such as naturally result from its position and its culture under the powerful influence of Arabic and Persian; every part of its vocabulary, and even some departments of its grammar, are filled with Arabic and Persian elements; so that it presents the remarkable and unique spectacle of a dialect made up of materials derived from the three grand and totally disconnected families of language, the Turanian, Semitic, and Indo-European, to the detriment, of course, of its native character, by the corruption of its forms and the artificiality of its style. This is true especially, however, of the language which is taught in the grammars and written in the literature; the vernacular idiom of the people is a much purer Turkish. The Osmanli is usually written with the Arabic alphabet, which is exceedingly ill suited to it, as to the Persian, since it marks the vowels very imperfectly, and in its distinction of consonantal sounds is in part defective and in part redundant; to construct the spoken alphabet and phonetic form of the language from the published grammars is well nigh an impossibility. It is also sometimes written with the Armenian alphabet, which represents it much more faithfully. It has 9 vowels: 4 hard, viz., *a*, *o*, *u*, and a peculiar guttural *i*; and 5 soft, viz., *ä* (*a* flat), *e*, *i*, *ö* (French *eu*), and *ü* (French *u*). In the same word, as a general rule, only vowels of one or of the other of these classes are allowed to succeed one another; the dominant syllable, which is usually the final one of the root or theme, assimilating to its own character all that follow it. The consonants are *y*, *r*, *l*; *ng*, *n*, *m*; *s*, *z*, *sh*, *zh*; *kh*, *gh*, *f*, *v*; *k*, *g*, *t*, *d*, *p*, *b*; *h*; and the compounds *ch*, *j*. The language has no proper articles, although its numeral "one" and its demonstrative are sometimes used nearly as articles. The adjective is uninflected. The nouns have no distinction of gender; their plural is formed by the addition of *lar* or *ler*. There is no nominative case-ending; the unchanged theme is employed as subject, in address (vocative), and also as indefinite object of a verb. Of cases, formed by inseparable affixed particles, which may properly be regarded as terminations of declension, there are an accusative, in *i;* a genitive, in *ung;* a dative, in *e;* an ablative, in *den;* an instrumental, in *le;* and a locative, in *de*. These suffixes are, saving certain slight euphonic changes, invariable; they are appended to the simple theme in the singular, and to the plural sign *ler* in the plural. The numerals are : 1, *bir;* 2, *iki;* 3, *üch;* 4, *dort;* 5, *besh;* 6, *elti;* 7, *yedi;* 8, *sekiz;* 9, *dokuz;* 10, *on;* 11, *on bir*, &c.; 20, *yegirmi;* 30, *otuz;* 40, *kirk;* 50, *elli;* 60, *eltmish;* 70, *yetmish;* 80, *seksen;* 90, *doksan;* 100, *yoz;* 1000, *bing*. To form the ordinals, *inji* is added. The personal pronouns, which alone offer some anomalies of declension, are: I, *ben;* we, *biz;* thou, *sen;* ye, *siz*. In the third person we have rather a demonstrative than a personal pronoun: that one, *ol;* those, *anlar*. Possessive pronominal suffixes are: *m*, my; *miz*, our; *n*, thy; *niz*, your; *i* or *si*, his, hers, its; *lari* or *leri*, their. These are appended directly to the nominal theme, singular or plural, and the affixes of case follow them, as *baba-lar-um-dan*, from my fathers. There is no relative pronoun, except the Persian *ki*. The verbal roots are not always reducible to a monosyllabic form. From each root are formed a number of themes of derivative conjugation, by adding conjugational affixes; these are, for the passive, *il;* for the reflexive, *in;* for the reciprocal, *ish;* for the causal, *der;* and for the negative, *me;* which last, by prefixing *e*, becomes a sign of impossibility. Any or all of these affixes may be combined at once with a verbal root, so far as the idea admits of their combined modification; so that in theory we may have as many as 36 themes from one root, each conjugated throughout in the same manner as the simple root: *e. g.*, from *sev-mek*, to love (*mek* is infinitive affix), come *sev-il-me-mek*, not to be loved; *sev-der-il-mek*, to be made to love; *sev-ish-il-eme-mek*, not to be able to be loved by one another, &c. The root of the verb, without affix, is the 2d person singular imperative: *e. g.*, *sev*, love! The tenses and moods are of two kinds, simple and periphrastic. The former are formed either by appending a predicative pronominal suffix to a participle (except in the 3d person, which is left without suffix), or by adding a possessive suffix to a noun of action; thus, from *dogmak*, to strike: pres. part. *dogur*, striking; pres. *dogur-um*, striking-I, *i. e.*, I am striking, I strike; pret. *dogd-um*, striking-mine, *i. e.*, I have struck. The periphrastic tenses are formed by combining a participle or noun of action with an auxiliary verb; as *dogmish idum*, having struck was I, *i. e.*, I had struck. By these means, a great variety of more or less genuine verbal forms is produced, in the admission and classification of which, however, grammarians greatly differ; and the verbal paradigm is a very rich one as regards the number and nicety of its distinctions. The prepositions in Turkish are all postpositive affixes; many proper prepositions, however, are borrowed by it from the Arabic and Persian, and are placed and construed according to the usage of those languages. It is almost entirely destitute of any conjunctions except those of Arabic and Persian origin, some of which—as those for and, but, or, if, as, that—are in frequent and familiar use, although more in the formal and written style than in the conversational. The place of conjunctions is supplied by gerundives and possessive forms, through means of which the different members of a compound sentence are twined into one, with the principal verb always at the end. This position of the verb, together with the operation of the rule that the determining word must precede the determined, gives the Turkish construction an inverted form which often seems very strange to our apprehension.—LITERATURE. The earliest literature produced by any of the divisions of the Turkish race is that of the Uigurs, a remote eastern branch of the family, who originally occupied the country south of Lake Baikal, but later established themselves about the Tangnu Tagh, and played a conspicuous part in the contests and migrations of central Asia during several centuries, until their nationality was swallowed up in the Mongol empire, about A. D. 1200. Something of culture and Christianity was communicated to them from Syria, doubtless by Nestorian missionaries; and their scanty alphabet, of 14 characters, formed from the Syriac, became later the parent of the Mongol and Mantchoo alphabets. Most of the Uigur literature is lost, and of what remains only few relics have found their way to Europe; little is known of it in detail, although it has been made to yield some information respecting the history of the people. They are said by the Chinese to have received and translated the Chinese classics and histories, and they are known also to have adopted to some extent the Buddhist doctrines and literature. The second era of Turkish culture dates from the conquest by Turkish tribes of the countries of Mohammedan Asia, beginning with the latter half of the 10th century. Overrunning first the north-eastern provinces of Iran, and finding there the new Persian literature commencing its career, their wild chiefs became its admirers, patrons, and imitators, and the Turkish mind and language received that strong Persian impress which they have ever since borne. The eastern Turkish literature, or that produced beyond the Caspian, is usually called the Jagataian, from the name given to that country in the partition of the Mongol empire. It is much less abundant, and also much less known, than the literature of the western branch. Its most flourishing period was from the time of Tamerlane (1400) to that of Baber (died 1530). Its most admired author is Mir Ali Shir, the vizier of Sultan Hussein, and a munificent patron of Persian authors, particularly of the poet Jami; his most interesting work, perhaps, is his collection of biographies of earlier Jagataian poets, with specimens of their productions. Of prime importance also are the memoirs of his own life and times by Sultan Baber, the conqueror of Hindostan and founder of the Mongol dynasty which has only just become finally extinct; they cover a period of nearly 40 years, and are written with entire simplicity and naturalness. The astronomical works prepared at Samarcand, under the patronage and direction of Ulugh Beg (died 1449), grandson of Tamerlane, deserve honorable notice.—The literature of the western, or Osmanli Turks, to which alone we usually apply the name of Turkish literature, is exceedingly rich, but it is, upon the whole, of inferior interest, because it contains so little that is original and distinctively national in style and spirit. It is mainly an imitation, more or less successful, of Persian models; or, in part, of Arabic also. As the language of the Osmanlis is crowded full of Persian words, compounds, phrases, forms of construction even, so is their history, their philosophy, their poetry, a re-working of Persian material, an echo of Persian taste. The history of the Osmanli literature commences with that of Osmanli nationality; even before the power of the dynasty was established by the capture of Constantinople, works had been produced which the nation has never let perish, and has hardly excelled; prominent among the great names of this era are those of Sheikhi, the romantic poet, and also the ablest physician of his time, of Solyman Chelebi, of Nesimi the free-thinker, &c. But the most flourishing period in the whole history of the literature was the following century, the 16th, chiefly during the reigns of Solyman the Magnificent and his son Selim. Early in the century wrote Meshihi, renowned as an elegiast, and Kemal Pasha Zadeh, a man of universal learning, and an admired author in many different departments, especially in history and in Moslem jurisprudence. Both these branches are of great importance and prominence in the Turkish literature. The latter of them—of inferior interest to us, but of the highest consequence to the Turks themselves, in its double aspect, religious and legal, and also indispensable to those who would fully understand the internal life of the nation—is illustrated by an unbroken series of great writers. In history, beside general and independent authors, such as Mohammed Effendi, Bechevi, Haji Khalfah, &c., deserve especial notice the line of official historiographers and annalists of the realm, commencing with Saad-ed-Deen; among his successors may be particularly mentioned Naima, Reshid, Izzi, and Vasif. Notwithstanding the turgid and affected style of the official historians, they are most valuable authorities for the history of the Ottoman empire, in its internal and its external relations. Saad-ed-Deen wrote under Solyman, and has been excelled by none who came after him in dignity and philosophic spirit; he brought the story of the rise and growth of the Turkish power down to 1526. Of the same period is Lami'i, one of the most highly esteemed of Turkish authors, and in some departments quite unsurpassed. His works are of varied character, in both prose and verse, and include many translations from the Persian. Fasli, distinguished by depth of thought and tenderness of sentiment, lived till 1563. But the chief ornament of the century is Baki, the acknowledged prince of Turkish lyric poets, and ranked by the orientals with the Persian Hafiz and the Arab Motanebbi in the trio of unrivalled masters of song. He died at a great age in 1600. A new period of literary activity and excellence, although decidedly inferior to that already referred to, followed in the 17th century, under the patronage of the great vizier Köprili, in the reign of Mohammed IV. Most worthy of note here are Nebi, the most admired poet of the century, Nefi, the first of Turkish satirists, Naima the historian, and Haji Khalfah, the historian, geographer, biographer, and encyclopædist, a man of immense learning and industry, whose history of Arabic, Persian, and Turkish literature, in Arabic, is a chief authority upon its subject, for both the East and the West. In the 18th century, the distinguished vizier Raghib Pasha is eminent both as an author and as a patron of learning; but among the innumerable writers, in every department, of the last century or two, there are few who deserve to be particularly noticed; we may mention merely Said Rufet Effendi, Aini Effendi, and Pertev Effendi as the most esteemed poets. The Turks have done little for the grammatical and lexicographical illustration of their own language, but, on the other hand, a great deal for that of the Arabic and Persian. The press was introduced into Constantinople early in the 18th century, by Ibrahim Effendi, and, both there and elsewhere, has been actively engaged in publishing the most important works in Arabic, Persian, and Turkish, especially the latter (including the series of official histories), together with hosts of less valuable or altogether insignificant productions. Many translations have been made by the Turks of European as well as oriental works.—The most accessible and useful helps to the study of Turkish are, of grammars, those of Davids (London, 1832) and Redhouse (in French, Paris, 1846); Kazem-Beg's grammar (in Russian; but in German by Zenker, Leipsic, 1848) includes also the other dialects, and is valuable for the comparative study of the language; Böhtlingk's Yakoot grammar (in German, St. Petersburg, 1851) is also important in this bearing. Of chrestomathies, we have one by Dieterici (in French, Berlin, 1854), and Barker's reading book, grammar, and vocabulary (London, 1854). The best dictionaries are those of Kieffer and Bianchi (2d edition, Paris, 1843–'6, Turkish-French), and Redhouse (London, 1856–'7); a new and more complete one, by Zenker, explained in French and German, is now (1862) upon the point of appearing. See also Max Müller, "Science of Language" (London and New York, 1862).

TURKS, one of the most important branches of the Turanian family, for an account of whose linguistic and ethnological affinities the reader is referred to the articles on the TURANIAN RACE AND LANGUAGES, and TURKISH LANGUAGE AND LITERATURE. In former ethnological classifications they were sometimes set down as a Caucasian race, and in physical characteristics some of their tribes are nearly or quite what has been termed Caucasian; but more recent science shows that with the Indo-European family they have no connection. The first traces we find of them are as dwellers upon the northern slopes of the Altai range and along the valleys of the Tang-nu mountains, between the Irtish and Yenisei rivers, on the confines of Siberia and China. From this region a portion of them emigrated S. W. into the country now known as Independent Toorkistan, occupying the valleys of the Jaxartes and Oxus; another party, taking a S. S. E. course, passed beyond the Altai, crossed the great desert and the Thian-shan mountains, and established themselves in the vicinity of Koko-nor and around the waters of the Hoang-ho. Here they led a nomadic life, following the course of the rivers which afforded pasturage to their flocks and herds, and depending upon these and the resources of the chase for a subsistence. A small number of their tribes preferred a permanent settlement, and engaged in agricultural pursuits; but the great body were for ages nomads, and by their frequent excursions for plunder into the Chinese towns and villages became the terror of that industrious but timid race. This branch of the Turkish family, occupying N. W. China, were called by the Chinese Hiung-nu ("vile slaves"), but proved too powerful for them for several centuries; and their empire in the 2d century B. C. extended, it is said, from the sea of Japan to the Volga, and embraced the whole of central Asia and a considerable portion of Siberia. They intermarried with the imperial family of China, and held the Chinese nation as vassals. At length, near the commencement of the Christian era, the Chinese emperor, by the aid of barbarian allies, defeated the Hiung-nu, and by encouraging divisions between their tribes contributed to their final overthrow. In A. D. 90 that portion of the Hiung-nu empire occupying the region S. of the Altai united with the Chinese in a war upon the northern portion, which resulted in their expulsion from the territory they had hitherto occupied, and their return to their former home in Independent Toorkistan. Before the commencement of the Christian era, a tribe of Turks had wandered westward as far as the Don; they are mentioned by Pliny under the name of Turcæ, and by Pomponius Mela under that of Iurcæ; while other tribes had not long after penetrated into the mountainous regions of Asia Minor. In the 4th and 5th centuries of the Christian era, a portion of the Turks who had remained in the N. W. of China succeeded in conquering two provinces of that country, which they organized as independent kingdoms, to which the Chinese give the names of Tchao and Northern Liang; but the greater part of those who were driven out in the 3d century rallied around Lake Balkash, and after the 5th century made no further separate appearance in history. In the early part of the 6th century a new Turkish empire, apparently having its nucleus in what is now Independent Toorkistan and Soongaria, threatened the peace of Asia. They renewed their conflicts with China at the E. and with Persia at the S. W., and in 569 formed an alliance with Justin II., then emperor of Constantinople, for the overthrow of the Sassanides. But this Turkish empire (which the Chinese called Tu-kiu), like all the attempts of the Turks at imperial domination, was an agglomeration of dissimilar peoples in one huge nation, with no common bond of union or citizenship, and its very vastness contributed to its weakness. In 744 the empire was overthrown by the attacks of the Hoei-he or Hoei-hu, as the Chinese named them (the Uigurs of western writers), another Turkish tribe who had previously been subjects of the Tu-kiu empire. There were at this time, and had been for some centuries, 8 distinct Turkish tribes or nations in central Asia. The Uigurs never attained to the vast power of their predecessors, but they were the first of the Turkish tribes to adopt a written language. At first they were Buddhists; but about the 4th century they became very generally the disciples of Zoroaster, and in the 9th or 10th century embraced Islamism, which had many doctrines suited to their taste. In the West their empire was overthrown in 848 by the Kirgheez Tartars; but they maintained an independent kingdom in the valleys of the Thian-shan range till about A. D. 1000, when the increasing power of the Khitans in China compelled their emigration westward. The invasion of Genghis Khan overthrew the last remains of the Turkish empire in central Asia; but the prominent officers of that conqueror and his successors were taken from this very tribe of Uigurs on account of their superior intelligence. But while thus for the time waning in power in their ancient seats, the Turks were acquiring new territories in the West. In the 6th and 7th centuries they were already in possession of an extensive region in what is now Asiatic Turkey, and were pressing forward toward S. E. Europe. In the 9th and 10th centuries the Tooloonides and Ikshides, who were the reigning dynasties in Egypt, were Turks. In the 9th century a Turkish dynasty, the Taherides, ruled in Persia;

and their successors, the Gaznevides and the Ghurides, extended their sway from Persia to India between the 10th and 12th centuries. A more famous Turkish dynasty however than either of these was that of the Seljooks (see SELJOOKS), whose dominion extended in the latter part of the 11th century from the frontiers of China to the vicinity of Constantinople. Like its predecessors, this vast empire crumbled to pieces from its want of homogeneity, and the Seljookian sultans submitted to be the tributaries of the Mongol emperors. At the beginning of the 14th century the Ottoman empire was founded by Othman, a Seljook chief, and in the succeeding centuries spread over a vast territory in Asia and Europe. (See TURKEY.) The Turkish tribes which had submitted to the Mongol invasion in 1257, and still remained in the region of the Thian-shan, the Aral, and the Caspian, sent out colonies N. of the Caspian into that portion of southern Russia lying on the borders of the Black sea, where, under the name of Tartars, several tribes of them still occupy extensive territories. While acknowledging the Russian sway, they are still zealous Mohammedans. The Tartar invaders of Toorkistan, instead of impressing their own habits and language upon the Turks of that country, gradually became identified with the people they had conquered; and eventually, the Turkish element again predominating, in the age following the death of Tamerlane they had invaded and subdued Armenia and the countries bordering on the Tigris and Euphrates. From this region they were expelled in the 16th century by the Soofees. In the same century the Usbecks, a Turkish tribe, primarily inhabiting the southern provinces of Chinese Toorkistan below the Thian-shan mountains, and said to be descendants of the Uigurs and the Naimans, made their way westward and overran not only Independent Toorkistan, but the countries adjacent as far as the Euphrates, and were, after maintaining their power for more than a century, reduced to subjection by still another Turkish tribe, the Toorkomans. The Toorkomans and Usbecks are now, in the ancient seat of the Turks, the principal remaining tribes of that powerful race. The Kalmucks between the lower Volga and Don, the Bashkirs between the Volga and Irtish, and the Yakoots on the banks of the Lena, are also Turkish tribes, in which there has been some admixture of the Mongol element, but who yet preserve sufficiently the Turkish characteristics to be fairly admitted as belonging to the great Turkish family. The Yakoots are the only Turkish race which professes Shamanism.

TURK'S ISLANDS, or TURQUES, a group of islets which lie in the S. E. extremity of the Bahama archipelago, about 60 m. N. from the coast of the island of Hayti; pop. estimated at 1,200. Grand Key or Turk's is the principal island, and salt is the only article exported from the group. The number of the population fluctuates greatly at different times, as many people are in the habit of coming over annually from the Bermudas to work at salt raking, returning when the season is over. This and the Caicos group constitute a U. S. consulate, of which the ports of entry are Grand Turk, Salt Cay, East Harbor, and West Caicos. The value of imports from the United States in 1860 was $87,-829.70, and of salt exported to the United States $107,978.74. American vessels entered, 164, tonnage 36,584, which was a decrease of 68 vessels from the previous year, while the British shipping in the American trade had increased. The total exports from the district in 1858 amounted to about $200,000, and the imports to $175,000.

TURMERIC, the rhizoma of the East Indian plant *curcuma longa*, and also of the *C. rotunda*, of the natural order *zingiberaceæ*. The root is perennial, tuberous, and internally of a deep yellow or orange color. The plant is cultivated in various parts of Asia, particularly in China, Bengal, and Java. The root obtained from China is said to be the best. It is received in short cylindrical pieces about as thick as the finger, of a yellowish brown or greenish yellow externally, hard and compact, and easily pulverized to a yellow powder. It has a peculiar odor, and a warm, bitterish, and feebly aromatic taste. It yields to alcohol and ether a yellow coloring matter termed curcumine, the color of which is rapidly changed by alkalies to reddish brown; a property which is made use of in chemical analyses as a test for the presence of alkalies. For this purpose white unsized paper is dyed with a tincture or decoction of turmeric, and is kept in the laboratory carefully preserved from access of acid or alkaline vapors. This is what is called turmeric paper. The root had formerly some reputation as a medicine, especially for jaundice and other visceral diseases. It resembles ginger in its properties as a stimulant aromatic; and in India it is used chiefly as a condiment, especially in curries. In dyeing it affords a fine yellow color, but not permanent. In pharmacy it is employed to give a color to ointments and other preparations.

TURNBULL, ROBERT, D.D., an American clergyman and author, born at Whiteburn, Linlithgowshire, Scotland, Sept. 10, 1809. After being graduated at Glasgow university, he attended the lectures of Chalmers and Wilson at Edinburgh, studied theology under Drs. Dick and Mitchell, united with the Baptist denomination, preached for a short time in Scotland and England, and came to the United States in 1833, settling in Danbury, Conn. In 1835 he accepted an appointment as a home missionary to Michigan, where he became pastor of the Baptist church in Detroit. Two years later he removed to Hartford, Conn., and became pastor of the South Baptist church in that city. In 1839 he was called to the pastorate of the Boylston street (now Harvard street) Baptist church in Boston, where he remained 6 years, since which time he has been pastor of the first Baptist church in Hartford. In 1851 he received the degree of D.D. from Madison university. He has published "The Theatre" (Boston, 1840); "Olympia Morata" (Boston, 1842); "Vinet's Vital Christianity," translated, with an introduction and notes (Boston, 1846); "The Genius of Scotland" (New York, 1847); "The Genius of Italy" (New York, 1849); "Theophany, or the Manifestation of God in Christ" (Hartford, 1851); "Vinet's Miscellanies" (New York, 1852); "Pulpit Orators of France and Switzerland" (New York, 1853); "Christ in History, or the Central Power" (Boston, 1856); and "Life Pictures, or Sketches from a Pastor's Note Book" (New York, 1857). He has edited Sir William Hamilton's "Discussions on Philosophy," with a historical introduction, and was for several years the senior editor of the "Christian Review," a Baptist quarterly periodical.

TURNBULL, Robert James, an American political writer, born in New Smyrna, Florida, in Jan. 1775, died in South Carolina in 1833. His father was an English physician, and his mother a Greek lady of Smyrna in Asia Minor. The father, Dr. Turnbull, in connection with Lord Hillsborough, obtained grants from the English government about the year 1772 for settling a Greek colony in Florida, which had been ceded to Great Britain by Spain in 1763. About 1,500 persons from the Mediterranean islands, chiefly Greeks and Minorcans, were induced to emigrate, and by them New Smyrna was founded. The project, however, was on the whole a failure; and Dr. Turnbull, adhering to the popular side in the revolution, forfeited his grants from government, and removed to Charleston, S. C. His son Robert James was educated in England, and after his return to America studied law in Charleston and Philadelphia, was admitted to the bar, and practised in Charleston until 1810, when he retired to the country, where he had a large plantation. His first essay as a political writer was a treatise on the penitentiary system, which attracted attention both in America and England. In 1827 he wrote many articles for the "Charleston Mercury," which were subsequently collected and published under the name of "The Crisis," and became the text book of the nullification party. In 1830 Mr. Turnbull published a treatise on "The Tribunal of Dernier Resort," in which he argued that "each state has the unquestionable right to judge of the infractions of the constitution, and to interpose its sovereign powers to arrest their progress and to protect its citizens." In 1831 he took a leading part in the "Free Trade Convention" which assembled at Columbia, S. C., and was the author of the report put forth by that body. He was conspicuous also in a similar convention which met at Charleston in Feb. 1832. On July 4, 1832, he delivered an oration before an assemblage of the nullification party, which is said to have had a marked effect upon the next election. In Nov. 1832, he was a delegate to the convention of the people of South Carolina which passed the nullifying ordinance, and he wrote the address of that convention to the people. After the proclamation of President Jackson was received in South Carolina, and volunteers were raised in addition to the militia already organized to resist the federal government, he was the first to enlist as a private soldier. A lofty monument in Charleston, erected by the nullification party, commemorates his services to their cause.

TURNER, Edward, a Scottish chemist, born in 1798, died in London, Feb. 13, 1839. He was educated at the university of Edinburgh, and in 1828 was appointed professor of chemistry in University college, then called the university of London, a position which he filled until his death. He is chiefly known by his "Elements of Chemistry," which has passed through numerous editions. His labors were devoted principally to inorganic chemistry.

TURNER, Joseph Mallord William, an English painter, born in London, April 23, 1775, died in Chelsea, Dec. 19, 1851. His father pursued the calling of a barber and hairdresser in Maiden lane, Covent Garden, and in this neighborhood the painter passed his childhood—a circumstance noticed with some particularity by Ruskin on account of its presumed influence upon his style and thoughts in after years. Having at 5 years of age accompanied his father on a professional visit to the house of a Mr. Tomkinson, he immediately afterward drew from memory a copy of a lion on an emblazoned coat of arms which he had seen there with such accuracy as to astonish his parents, who thereupon, it is said, conceived the idea of making a painter of him. Thenceforth his pencil was seldom idle, and, with water colors and brushes supplied by his father, he made sketches of the principal objects which his limited field of observation presented. After a year or two of schooling, during which he occupied himself more with sketching trees, cattle, and landscapes from nature, than with books, he was employed by the engraver John Raphael Smith to color prints, to which occupation succeeded the painting of skies, backgrounds, and other accessories for architectural designs. The example of Cozens and the friendship of Girtin, two of the founders of the British school of water colors, led him to attempt higher things; and in 1790, having the year previous become a student at the royal academy, he exhibited a water color "View of the Archbishop's Palace, Lambeth." Other works depicting scenes in the neighborhood of London followed, and with each year he showed increasing power and originality, infusing more light into his pictures than other contemporary artists, and occasionally essaying some novel effect derived from a close study of nature. In 1793 he was engaged to illustrate Walker's "Itinerant" and the "Pocket Magazine;" and during the next 5 or 6 years he made sketches for this purpose in many parts of England, filling up his intervals of leisure by giving lessons in drawing. Although until near the commencement of the present century he painted chiefly in water colors, a branch of the art then by no means in high estimation and but imperfectly developed, the brilliancy and singular fidelity of his finished drawings began to attract attention, and by many critics of the day his preëminence in landscape painting was even then predicted. The royal academy ratified this opinion by electing him in 1799 an associate, and in 1802 an academician. He had hitherto confined himself chiefly to representations of English or Welsh scenery, but with the acquisition of academic rank he put forth his strength in such ambitious subjects as "The Fifth Plague of Egypt," "The Army of the Medes destroyed in the Desert by a Whirlwind," and "The Tenth Plague of Egypt," executed in oils; but these, in spite of their imaginative power, were less popular than his "Dutch Boats in a Gale," "Fishermen upon a Lee Shore in Squally Weather," or "Falls of the Clyde." The surpassing excellence of his representations of marine scenery and of water under all conditions was first recognized in the latter class of pictures. In 1802 he first visited France, commemorating his arrival in that country by a picture of "Calais Pier;" and thenceforth at irregular periods he made extended and solitary tours through France, Switzerland, and the Rhine land, the fruits of which were presented in manifold sketches, drawings, and finished pictures. In 1807 he was elected professor of perspective to the royal academy, and in this capacity delivered a few lectures, which according to the general account were little creditable to his abilities as an artist. He seems to have been unable to express himself with sufficient clearness to interest his classes, and cared little about imparting instruction, unless he perceived an ability on the part of the pupil to profit by his obscure hints. "Turner, though he was professor of perspective to the royal academy," says Ruskin, his panegyrist, "did not know what he professed, and never, as far as I remember, drew a single building in true perspective in his life; he drew them only with as much perspective as suited him." With his election as an academician terminates what is known as the first style of Turner, or that in which he studied and imitated the methods of Wilson, Gainsborough, and others of his predecessors, and elaborated the details of nature with a sobriety of color approximating to coldness. His second style, which in general terms may be said to embrace the period between 1802 and 1832 (although such a division is purely arbitrary, and is to be adopted for the sake of convenience only), commenced with an imitation of Claude Lorraine; and the desire to rival and if possible to surpass his model led to the publication in 1808 of his *Liber Studiorum*, the superiority of which over the *Liber Veritatis* of Claude does not however afford a fair test of the comparative merits of the two painters; Turner's studies being elaborate and careful illustrations of all the principal forms of landscape composition, while Claude's are but incidental memoranda of pictures. In further competition with Claude he painted his "Sun rising through a Mist," "Crossing the Brook," "Apuleia in search of Apuleius," "Dido building Carthage," and some others of less note; but his individuality soon broke through the shackles of mere imitation, and subsequent to 1815 he worked according to his own ideas, indifferent to the examples of preceding masters. The variety of subjects he attempted during the 12 years previous to this time affords a curious illustration of the originality and audacity of his genius. Not content with the production of works like the "Shipwreck," the "Wreck of the Minotaur," and the "Snow Storm—Hannibal crossing the Alps," which presented with incomparable power the elements in their wildest fury, or like the "Edinburgh from Calton Hill" and the "Falls of Schaffhausen," he ransacked Lempriere's dictionary for subjects, painted humorous and whimsical pieces, such as a "Country Blacksmith disputing upon the Price charged to the Butcher for Shoeing his Pony," and even attempted sacred history, having in 1803 exhibited a "Holy Family." From 1815 his conceptions expanded with his increasing observation and knowledge of the phenomena of nature, and subsequent to his first visit to Italy in 1819 his style may be said to have matured into its full splendor. Between 1820 and 1840, when he returned from his third and last visit to Italy, the second having been made in 1829, he was perhaps greatest and most original; and his "Bay of Baiæ," "Ulysses deriding Polyphemus," "Caligula's Palace and Bridge," "Childe Harold, or Modern Italy," "Slavers throwing overboard the Dead and Dying—Typhoon coming on," "The Fighting Téméraire towed to her last Moorings," and other works produced within this period, represent the highest efforts of landscape painting in composition, in color, and in the general vein of poetic sentiment which pervades them. The tendency toward brilliancy of light and color which several of these works evinced became during the last 10 years of his life the most marked feature of his style; and, disregarding individuality of form or local color, he made light with all its prismatic varieties the sole object of his studies. The consequences were lamentable to his reputation, and his remaining works, loosely executed, untrue to nature, and apparently without meaning or form, excited the ridicule or pity of most who beheld them. It was said that the hanging committees were sometimes in doubt which side of his pictures to suspend uppermost, and that the artist had by mistake forwarded his palette set with colors instead of a picture. There are however some who profess to see amid the extravagances of his latest style a solid foundation of truth and infinite suggestiveness; but the number of such persons is inconsiderable, and according to the popular opinion his later pictures might better never have been painted. In one department of his art, however, that of designing from nature for illustrated works, Turner remained in the highest request until the close of his life; and in none of his productions does he appear more truly great than in his finished drawings and engraved designs. Among the most famous of these may be mentioned his "Rivers of England," "Rivers of France," "England and Wales," "Scenery of the Southern Coast," and the exquisite illustrations of the poems of Rogers, Byron, Scott, and others, in all of which he shows a knowledge of landscape in its infinite variety of forms superior to that of any other artist on record. Fine line engravings of large size have also been executed from some of his most remarkable paintings; and, as if conscious that his reputation was destined to rest in a great measure upon this class of his works (an anticipation which has partially proved correct, as many of his pictures, owing to a careless use of pigments and varnishes, are rapidly losing their effects and crumbling to decay), he devoted much time to retouching the proofs, adding and altering the details down to the minutest twig. From 1790 until his death he contributed to every academy exhibition except three, sending altogether 259 pictures.—Turner was never married, and throughout life exhibited an eccentricity of character, which, whether real or assumed, subjected him to many injurious aspersions. Though reputed unsocial, reserved, and uncharitable in his opinions, he was, according to Leslie, in reality of a social nature, and, if not given to praising the works of his contemporaries, was never known to disparage them. One of his most prominent characteristics was a love of mystification, under the influence of which he worked and travelled alone, often concealed his abode for months from his most intimate friends, and died finally after a protracted absence from London in lodgings at Chelsea, where he was known under the name of Booth, and commonly supposed to be an admiral in reduced circumstances. Of his parsimony many exaggerated stories have been related; but the provisions of his will bequeathing the bulk of his large fortune to found an asylum for decayed artists, to be called "Turner's Gift," and such of his pictures as were in his possession to the nation, show that he hoarded his money for no purely selfish purpose. His intentions were partially thwarted by the unskilful manner in which the instrument was drawn; and while his pictures, drawings, and sketches have fortunately been secured to the nation, the remainder of his property, with the exception of £20,000 appropriated to the royal academy, was divided among his next of kin. The oil paintings, numbering upward of 100, and comprising specimens of his style from the outset to the termination of his career, are now deposited in the national gallery. Two of them, the "Building of Carthage," which he esteemed so highly that he is said to have announced his intention of being buried in it, and "Sun rising through a Mist," with a feeling prompted by his early rivalry of Claude, he directed should be hung next to prominent works by that master. The drawings, studies, and sketches, numbering altogether upward of nineteen thousand, constitute with the paintings a legacy of inestimable value, and have been cleaned, mounted, and arranged by Mr. Ruskin. "Turner," says Leslie in his "Autobiographical Recollections," "was short and stout, and he had a sturdy, sailor-like walk. There was in fact nothing elegant in his appearance, full of elegance as he was in art; he might be taken for the captain of a river steamboat at the first glance; but a second would find far more in his face than belongs to an ordinary mind. There was that peculiar keenness of expression in his eye that is only seen in men of constant habits of observation. His voice was deep and musical, but he was the most confused and tedious speaker I ever heard." Though not addicted to literary pursuits, he appears to have tried his hand at a poem in blank verse entitled "The Fallacies of Hope," extracts from which, for the most part "destitute of rhyme, rhythm, or reason," were frequently appended to the titles of his pictures in the royal academy catalogues.—The prominent position which Turner now occupies is due in no slight degree to the eloquent if not always discriminating criticisms of John Ruskin, whose "Modern Painters," conceived in an intense enthusiasm for the genius of the painter, contains an exhaustive analysis of his works. Time alone can determine whether he was altogether fortunate in his panegyrist; but without accepting the dogma of Ruskin that "none before Turner had lifted the veil from the face of nature," we may unhesitatingly pronounce him a consummate master of composition, unrivalled in his knowledge of landscape and in his capacity to express the variety as well as the grandeur of nature. Dr. Waagen, a critic not given to hero worship, declares that no landscape painter has yet appeared with so great a versatility of talent, and that but for his deficiency in a sound technical basis he would be the greatest artist in his peculiar department of all times. The only biography of Turner which has yet appeared is one by Walter Thornbury (2 vols., London, 1862).

TURNER, Samuel Hurlbeart, D.D., an American clergyman, born in Philadelphia, Jan. 23, 1790, died in New York, Dec. 21, 1861. He was graduated at the university of Pennsylvania in 1807, studied theology under Bishop White, was ordained deacon, Jan. 27, 1811, and in the following year became rector of the church at Chestertown, Md., where he remained until obliged to leave Maryland on account of his health in 1817. In Oct. 1818, he was elected professor of historic theology in the general theological seminary in New York, and in 1821 professor of biblical learning and the interpretation of Scripture in the same institution. He was also in 1831 appointed professor of Hebrew in Columbia college. He published "Thoughts on Scriptural Prophecy," "Companion to the Book of Genesis," "Biographies of Jewish Rabbis," commentaries on the Epistles to the Romans, Hebrews, Ephesians, and Galatians, and other works.

TURNER, Sharon, an English historian, born in London, Sept. 24, 1768, died there, Feb. 13, 1847. He was by profession an attorney, but retired from business in 1829. Having devoted much time to the investigation of Anglo-Saxon remains, then an unexplored mine of historical wealth, he published a "History of the Anglo-Saxons" (4 vols. 8vo., 1799–1805; new ed., 3 vols. 8vo., 1836–'9), and subsequently brought out a "History of England in the Middle Ages, with a Continuation to the Death of Elizabeth" (5 vols. 4to., 1814–'29; 3d ed., 9 vols. 8vo., 1839). His other works are: "A Sacred History of the World, as displayed in the Creation and subsequent Events to the Deluge" (3 vols. 8vo., 1836–'9); "Sacred Meditations by a Layman;" "A Prolusion on the Greatness of Britain, and other Subjects;" and "Richard III., a Poem."—**Sydney**, an English clergyman, son of the preceding, became in 1838, soon after taking orders, superintendent of the reformatory school of the philanthropic society in London, and effected its reorganization as the Red Hill reformatory near Reigate in 1846; and since 1857 he has been inspector of reformatories in England and Scotland. He has published "Reformatory Schools, a Letter to C. B. Adderley, Esq., M.P." (8vo., 1855); a new and enlarged edition of his father's "Sacred History of the World" (1858); several pamphlets on reformatory education; and 3 voluminous reports as inspector of reformatories.

TURNER, William, an English physician, naturalist, and divine, born in Morpeth, Northumberland, about 1520, died July 7, 1568. He studied medicine and divinity at Cambridge, and took a decided part in the religious discussions of the time, whence he became obnoxious to the dominant party, and was imprisoned. After his release he went to the continent, and studied natural history at Zürich and Bologna. Upon the death of Henry VIII. he returned home, and in the reign of Edward VI. became physician to the protector Somerset, and later prebendary of York, dean of Wells, and canon of Windsor. When Mary ascended the throne he was again obliged to fly the country, but returned upon the accession of Elizabeth, and was reinstated in all his original benefices. The work on which his reputation rests is his "Herball," the first book of which appeared in London (fol., 1551), and the second at Cologne (1552). He wrote also *Avium Præcipuarum, quarum apud Plinium et Aristotelem Mentio est, Historia* (8vo., Cologne, 1554); the account of British fishes in Gesner's *Historia Animalium;* and several works on controversial divinity.

TURNER, William Wadden, an American philologist, born in London in 1810, died in Washington, D. C., Nov. 29, 1859. He was brought to New York at the age of 5 years, received an ordinary school education, and was apprenticed to his father's trade, that of a carpenter; but after 3 years his fondness for reading and other causes led him to become a printer, and he accordingly apprenticed himself to that trade in 1829. He possessed a remarkable facility in the acquisition of languages, and at the age of 26 was master of French, Latin, German, and Hebrew; he then studied Arabic with Prof. Nordheimer, and the two proposed to publish together an Arabic grammar, but, finding little encouragement, prepared instead of it a Hebrew grammar and chrestomathy. Mr. Turner went to New Haven to print it, as the only sufficient supply of oriental type was to be found there and at Andover, and worked upon it as a compositor during the day, while he prepared the manuscript at night. After the completion of this work Mr. Turner added to his linguistic attainments a knowledge of Sanscrit and most of the other leading Asiatic languages, and subsequently turned his attention to the languages of the North American Indians, and edited a grammar and dictionary of the Dacotah language, which was published by the Smithsonian institution. In 1842 he was appointed instructor in Hebrew and its cognate languages in Union theological seminary, New York, and remained in that position till 1852, when he received the appointment of librarian to the patent office at Washington, where he continued till his death. Beside the works already mentioned, Prof. Turner translated Von Raumer's "America and the American People," and part of Freund's Latin dictionary (1851), and assisted Dr. Kaufmann in translating Mackeldey's "Compendium of Modern Civil Law."

TURNERS. See Gymnastics.

TURNING, the art of shaping wood, metal, or other hard substances into forms having usually curved, and most commonly circular outlines, and also of executing figures composed of curved lines upon plane or cylindrical surfaces, by means of appropriate tools and a machine called a lathe. Theodore of Samos, named by Pliny as the inventor of turning, may have originated the application of the process to the shaping of hard substances. The principle of turning is simple. A piece of wood or other hard substance being so fixed in a horizontal position by pivots or otherwise at its two ends as to be allowed to revolve freely about an axis in the direction of its length, and caused to turn rapidly in this manner, while a chisel or other cutting tool is approached to the piece so as to meet it as it advances on one side, and held firmly to it, the tool will cut away from the piece at that place all the material outside of a circle whose radius is the distance of its point from the axis of motion; thus it will give to the part a circular outline, and will reduce the diameter of this circle as its point is advanced further into the material. The tool being gradually moved along the length of the turning piece, it can thus be made to reduce successively the entire length to the circular outline, and, by cutting to different depths in different parts, to produce a turned piece marked with circular grooves, or other forms of curved surface, as required for ornament or use, and as seen in turned bed posts, the turned legs of chairs and tables, &c. The piece to be cut or worked to a required form is known as the "work." In the simpler modes of turning, the cutting tool is held to this by the hand, but steadied by means of a fixed rest. Outside circular turning is the most common, and is known as "centre work." With lathes of peculiar construction the work may be turned hollow, or bored or reamed, or turned both inside and out.—The primitive and most simple kind of horizontal lathe is that known as the pole lathe. In this, from a bed formed of two horizontal planks or beams with a narrow space running along between them, and supported at a suitable height, two uprights or puppets rise, one stationary at one end of the bed, the other having a tenon passing through the space and secured by a wedge beneath, so as to be movable along the bed, to accommodate it to the length of the work. Near the upper end of each puppet, on the sides facing each other, is a conical iron or steel point, the two being in the same line. The piece, being cut to the proper length, is placed between the points, and the movable puppet brought up so that both points are pressed slightly into its ends; the line between these is the axis about which the piece will revolve. The fixed rest is placed conveniently for steadying the tool; while to turn the work, a groove being cut about it, usually at the left end, a stout cord or catgut is passed twice or oftener about the piece, then drawn straight and attached below to a treadle to which the workman's foot is applied, and above to an elastic pole or lath fixed at one end to the ceiling overhead, whence, probably, the name pole lath, or simply lath, or lathe. The workman holds the gouge or chisel to the work, and pressing down the treadle with his foot, the work is caused to spin rapidly round toward the point of the tool; and so long the latter takes effect. When the treadle, having come quite down, is released by the foot, the recoil of the lath carries back the cord and work in the reverse direction, and the tool does not cut. If it is required to turn the entire length of the piece, the cord must be shifted after a time to the finished part. This contrivance serves for ordinary wood turning; but on account of its imperfections, and especially the loss of time during the return or rising of the treadle, it is now little used. For light or fine work, the pole is often replaced by an elastic bow and string over head, the cord giving the revolution being attached to the middle of the string. But the forms now more usual, and especially for heavy work, are: 1, the foot lathe, in which the treadle is by a link made to give motion to a crank, from a larger grooved wheel upon which a cord crosses in form of an 8 to a smaller grooved wheel or pulley fixed upon an axis at one end of the work, and giving motion to it; 2, the hand-wheel lathe, in which the power is applied by the action of one or two persons in turning a wheel, from which a band communicates movement to the axis and work; and 3, the power lathe for the heaviest work, moved by horses, water, or steam. Any wooden lathe, such as is used by turners in wood, is also distinguished as a bed lathe; while those of iron, for the best work in metals, are called bar lathes. In any form of lathe such as those now considered, the turning axis at one end of the work, to receive the power and give motion to the piece, in place of the simple point which can be used in the pole lathe, becomes indispensable. This axis is called the mandrel, and sometimes the "live spindle." To support this properly, the fast head, or headstock—that which is fixed and (in reference to the workman's position) at the left hand end of the lathe—is constructed with two upright pieces at a suitable distance apart, and firmly secured to the bed. Through the inner or front one of these uprights is a circular opening containing a metallic ring or collar, within which the mandrel turns, and just within or in front of which it terminates in an exterior or interior screw or other device for holding the chucks, presently to be noticed, that fix the corresponding end of the work. Into a depression in the opposite end of the mandrel, the steel point of a screw which is worked by hand through the outer upright is advanced so as to fit closely; and the two uprights thus, by means of this point (or sometimes a collar), and of the collar already mentioned, support the mandrel, and keep it in the position required. On the mandrel the speed pulleys and the larger wheel for slow motion are placed; and directly beneath these, under the bed, in foot lathes, are the corresponding wheels upon the axis of the crank, this axis being situated at the required height, and its ends turning in collars in the standards at the ends of the machine. When the end of the mandrel extending through the inner upright terminates in, or is furnished at its middle part with, a point for entering one end of the work, this is called a "centre;" this point or centre must be accurately in the line of the axis of the mandrel; and this axis must also be perfectly parallel with both the direction of the bed and that of the centre line of the slit or space along which the movable puppet is shifted. By means of a suitable shoulder upon the mandrel, or by giving to the part of it within the collar and to the collar itself a conical form, it is prevented from sliding endwise within the headstock. The movable upright, or tailstock, has a tenon or foot passing down through the space in the bed, upon which it is made to fit accurately; and it is held firmly by screwing up against the under side of the bed the nut of a hand screw in which the foot terminates; by loosening this, the tailstock can be shifted to any position required by the length of the work, and again fixed. The point or "centre" of the tailstock must be in the same line with the axis of the mandrel; and in the better styles of lathe, this point can also be advanced through the upright by turning a horizontal screw of which it forms the inner end, for the purpose of tightening the work. In power lathes, the tailstock may be advanced along the bed by means of a hand wheel and a pinion working in a horizontal rack. The fixed and movable uprights may be of cast iron; but when the bed of the lathe is of iron, the puppets are sometimes made of oak or mahogany, as lathes entirely of metal are subject to an inconvenient elastic tremor. The construction now described is essentially that of the best foot lathes for centre work, and which are adapted to turning all ordinary materials, whether metals, ivory, or wood. The chucks, or contrivances fixed upon the end of the mandrel, are of various forms and construction, according to the kind of work they are intended to secure; the most common being the screw chuck, the hollow, drill, universal, concentric or die, and ring chuck, and the carrier and driver. The crowning improvement, moreover, in the adaptation of the lathe to accuracy of work, and to that of all varieties, is attained through the invention of the slide rest, a carriage upon which the tool is supported, and by the construction of which it can be moved along the work by the machine or by hand, and at the same time advanced toward it, or set at any angle, as the character of the work may require.—In wood turning, the woods most used for common toys are willow, whitewood, beech, birch, and alder; for the best wooden wares, sycamore, apple, pear, plum, &c.; for work of great strength or of close texture, and for certain peculiar purposes, box, walnut, mahogany, oak, or elm, pine, &c. The wood to be turned may be prepared by rounding with a hatchet and rasping; and for many purposes the centres of the ends must be accurately found, as by laying the piece on a true plane, striking arcs on its ends with the compasses, turning on the several sides successively, and finding the point indicated by the intersections of the arcs. Soft woods are most difficult to turn; the velocity should be great, and the tool presented nearly to the top of the work, and held very firmly, cutting only a thin shaving. For hard wood and other turning, the tool is presented a little above the centre line of the work. Generally, wood requires the highest velocity; brass and bell metal a velocity not more than one half as great; wrought iron and copper still less, the tool being kept cool by water trickling upon it; steel still more slowly; and cast iron slowest of all. Common gouges, with cutting edge of hollowed and semi-circular form, are used for roughing out wood work, and chisels for smoothing it and bringing it to form; while for ornamenting, or executing various arrangements of broken and curved surface and outline, the chisels (then sometimes called gravers) receive an almost endless variety of general shape and of cutting edge. After being turned, the work is often polished by pressing against it suitable substances while it revolves. Soft wood is usually polished with shark's skin or Dutch rushes; ivory and horn, with pumice stone and chalk; metals, with tripoli or putty powder.—In the cases thus far considered, there is but one axis or centre line of the work; that is, the centre line is a fixed direction throughout the process of cutting. But it is desirable to execute work in which the cutting in different parts or moments shall be in reference to two or more different axes through the solid or surface acted upon. A simple mode of effecting this, sometimes resorted to, is that of fixing the work successively with the different axes, and turning it at two or more operations. But practically, a far more complete and satisfactory result is attained, the forms executed being variable at the pleasure of the workman, by incorporating into the lathe devices which shift the place or direction of the single axis of motion, and in a defined manner and degree, while the work is rotated and the tool continually acting upon it. This species of turning, with a variable centre of the work at different moments, takes several names according to the devices employed or the particular results secured, as eccentric, geometric, oval, and rose-engine turning. Such work is said to be figure-turned; and the general principle is that of employing some form of chuck which shall give an oscillation or lateral movement to the axis of the work during its revolutions, so as to insure those deviations from a simple circular application of the cutter, required for the intended form or figure. The chucks employed are designated as the eccentric, the geometric, the oval, or more properly elliptical, and as rosettes; while a straight line chuck can also be employed to cut plane surfaces or square work. In all work of this character, the amateur turner prides himself not only on the delicacy and elegance of his results, but quite as much on the difficulty of execution; and the value of turned work is often estimated by the degree in which it departs from the circular figure. For eccentric turning, a single eccentric chuck is one fixed upon a strong plate that can slide laterally within straight guides screwed upon the face of the mandrel, and which, having upon it a toothed wheel and click, is called the click-plate; the slide, and the nose upon it for carrying the work, can be shifted into various positions out of centre, before applying the cutter. In the double eccentric chuck, a second plate or slide at the back of the first, and at right angles to it, can further vary the position of the axis. By aid of such a chuck, any required part of a disk can be brought in line with the centre of the mandrel, and holes bored in any part of it, or the edges hollowed out in curves of like or different radii, or polygons with curvilinear sides accurately produced. Ornamental work with these chucks consists mostly in the execution of variously curved figures on surfaces, without cutting away or changing the general outline, as in ornamenting ivory or fine work in wood. The ivory turner often employs a small instrument called an eccentric cutter, in which the tool revolves rapidly, being moved by a bow, and with which, by means of a single eccentric chuck, and a separate adjustment of the cutter, involved figures like those ordinarily requiring the double eccentric chuck are produced. For geometric turning, a chuck of similar name is employed. In this, a wheel concentric with the mandrel, while the latter and the chuck revolve, gives, by means of a train of smaller wheels, an independent movement to the click-plate and axis of the work. By varying the relative sizes of the wheels, by introducing an added wheel to cause the work to turn at the same time in a direction the reverse of that of the mandrel, and by changing the position of the tool, or giving movement at the same time to it, an almost infinite variety of curiously involved curved figures may be engraved or marked upon a plane surface to which motion is thus imparted under the point of the tool. It is by this machine that some of the most perfect rosettes and other lathe work of bank notes, in the United States largely relied on as a means for the prevention of successful counterfeiting, are executed. The figures will vary with the construction of the machine; of which, save by actual inspection or model, no duplicate can be constructed. The geometric lathe of the American bank note company of New York, the single one of its kind, is a foot lathe of highly complicated and perfect workmanship, the construction of which is said to have occupied three years' time, at a cost of $10,000. Elliptical turning is accomplished by means of the elliptical or oval chuck, in which the pressure of an eccentric ring, moving within and clasped by rubbers, is made to draw the slide out of centre alternately in the opposite directions, so that a stationary tool, held to a plate to which this movement is imparted during a revolution of the mandrel, will describe an ellipse instead of a circle; while the size, direction, and form of the ellipses can also be varied; and, as in the other forms of lathe here described, the micrometer screw may be introduced for determining the accuracy of proportions in the work. Rose-engine turning is, perhaps, the form most generally applicable and employed for producing involved curvilinear figures, as for the embellishment of bank notes, or for other patterns on plates and blocks for printing and embossing. Thus, it is in use for gold, silver, and gilt work; and also for producing on the cylindrical surface of copper, steel, or wooden rollers, borders or ornamental figures for impression upon calico, leather, and paper. The principle of construction may be briefly indicated as follows: the standards that directly support the two ends of the mandrel are not, as in other lathes, firmly set into the bed, but held beneath the line of the mandrel by a pivot at each end projecting from pieces set in the bed; an axis extends across between these pivots, uniting the standards, and parallel with the mandrel. Thus the mandrel, while made to revolve, can also oscillate or swing laterally on the pivots, means being employed for this purpose to push it to one side, and a strong spring continually acting to restore or bring it back, as soon as allowed, from any position into which it may thus have been forced. Suppose, now, the work is a flat metallic plate affixed on the face of the chuck; that the figure is a waving or scalloped line, or a combination of such to be engraved or cut in the face of the plate; and that the tool is held at a certain point against the plate by the slide rest, ready to execute the figure. The mandrel is now made to revolve, carrying round with it the chuck and work; and so far, the line executed should be a circle only. But the mandrel is so delicately hung that, while turning, it will obey every impulsion acting to displace or push it aside laterally from the line in which it begins to revolve; and carrying the chuck and work with it, the tool will then cut a line deviating by precisely like amounts from the circle. It only remains, then, to give the required deviations or deflections to the mandrel and chuck, and their effect will be exactly reproduced in the figure executed. To accomplish this, as many different pattern guides are mounted on the mandrel itself, as the number of the differently waved lines that may be needed. These pattern guides, called rosettes, are circular plates of gun metal or brass, each about half an inch thick, and having on its two sides the rim indented, waved, or scalloped in different patterns, so that each wheel can be used to give two separate figures. These rosette patterns may vary in diameter, and the waves on each wheel may be from 12 to 144 in number; the number of patterns thus put upon a single mandrel may be 12, 20, or more, according to convenience. The particular pattern that shall in any case be transferred to the work is simply determined by the employment of a movable rubber carriage, fixed on commencing the work, which carries firmly set upon it a horizontal bar of steel, 3 or 4 inches long, called the rubber; this has on one end a small smooth roller, and the opposite end is small, rounded, hardened, and polished; it can be reversed at pleasure, and being placed at a level with the axis of the mandrel, either the roller or the point becomes, by its connection with the fixed carriage and bed, a fixed point working accurately against the curving periphery of either pattern upon any given rose-wheel, and being continually resisted by the spring which pulls in the opposite direction, the combined effect is to deflect the mandrel and work precisely with the variations of outline of such wheel. The point of the rubber is substituted for the roller when the indentations of the pattern are very fine. To insure a more uniform movement, and to communicate the motion while allowing the oscillations of the mandrel, the engine is driven by a hand winch with a band passing round a foot wheel, while a second band passes from a small pulley on this axis to the mandrel pulley. By shifting the slide rest as required, a number of like concentric curves are executed; and by employing and cutting one pattern over another, an endless variety and complexity in the figures may be obtained.—Of the few machines which have been invented for turning irregular forms, in heavy or ordinary work, that of Blanchard is perhaps the best known and most successful. (See Blanchard, Thomas.)—For further information respecting the tools and materials used in turning, and for many other details, see Holtzapffel's "Turning and Mechanical Manipulations" (3 vols., London, 1847-'52); and for the general subject, see article "Lathe" in "Appleton's Dictionary of Machines," &c. (New York, 1857), and Valicourt's *Nouveau manuel complet du tourneur* (3 vols., Paris, 1848-'53).

TURNIP, an esculent root known in gardening and agriculture. The common or field turnip originated by a long cultivation of the wild *brassica rapa* (Linn.), a biennial of the natural order of *cruciferæ*, and growing spontaneously in Great Britain and Europe. Its root is small, round, fleshy, tapering downward with a few fibres into a radicle; the leaves near the root are lyrate-pinnatifid, jagged, rough, and green, with fleshy petioles; the stem 1 to 4 feet high, branched, with nearly entire and smooth leaves; the flowers of a pale yellow, the pods (siliques) erect, slender, linear. The field or garden turnip is distinguished by its flattened root, expanding beneath the origin of its stem into a thick, round, fleshy tuber. It is subject to great variation in the size and weight of the root, owing to its tendency to enlarge in rich or proper soils; and it may differ in its flavor, or in the shape of the foliage, or even in the color of the root. A distinct permanent variety is the tankard or decanter turnip, in which the root is of an oblong form, and of which there are red and white kinds. The roots of this variety are, however, of a looser texture, and it is less hardy than the common turnip.—The Swedish turnip or ruta baga, also extensively grown as a field crop and for feeding cattle, originated from the *B. campestris* (Linn.), a plant indigenous to Europe. Its young leaves are hairy, but the older ones are smooth and glaucous, lyrate-toothed, those of the stem cordate-amplexicaul, acuminate; the flowers whitish yellow. The root of the ruta baga in its best condition is yellow both externally and internally; when the flesh becomes white and the apex of the root runs up into a sort of stalk or stem during the first year, it is considered inferior; and on blossoming, the flowers have been observed to be of a deeper yellow.—The French turnip originated from the *B. napus* (Linn.); its leaves are smooth and glaucous, the lower ones petioled, lyrate-pinnatifid, the upper oblong, cordiform-amplexicaul; the flowers yellow; the pods linear. The esculent variety is the *navet* of the French, the root forming an oval tuber below the crown or origin of the stem. There are at least 3 varieties of this sort distinguished by their color: the white, which is the most common; the yellow, of a more delicate flavor; and the black, so called from the blackish tint of its skin. The French turnip is considered sweeter and freer from any acrid properties than the field or garden turnip, and it is much prized by some for the table.—Botanically considered, the French, Swedish, and English or field turnip are related to the cabbage, and likewise seem to hold intimate relations to each other, so that their specific differences have been a matter of much uncertainty.—In Great Britain, where the turnip culture is of great importance as preparatory to a system of successive crops, and where it has become essential to agriculture, the different kinds are exceedingly numerous, and have been obtained by careful seed sowing, hybridizing, and experimental processes to procure the best varieties. Such a need does not exist in the United States, where productive crops of Indian corn will be found better suited for breaking up new ground and fitting it for future operations. Our drier atmosphere and our liability to droughts render turnips as a crop more uncertain, yet by careful management they can be raised with profit. Lands in tillage, of almost any nature, especially those of a light sandy loam, can be sown with turnips, the Swedish and the French turnips requiring the deepest and the best. After taking a crop of grass from the field, it may be broken up, manured, harrowed, and sown with ruta baga, thinning if the plants stand too thickly in the rows, hoeing to keep them clear, and pulling the roots in November. It has been found on experience that, generally speaking, the sorts originating in this country are better suited to our climate, and their seeds command higher prices, than the English or continental seeds. Of 52 sorts of turnip seeds imported from abroad by Mr. David Landreth of Philadelphia, he found two only which he thought worth perpetuating. The catalogues however advertise for sale about a dozen, some designated as American, of which perhaps the red strap-leaved and the white strap-leaved, the long French white, and Skirving's ruta baga are among the best. The turnip is subject to much injury from insects, and in Europe entire fields have been destroyed by a small coleopterous insect, which feeds on the seed leaves and growing foliage. (See Turnip Fly.) Plant lice or aphides and several larvæ injure the roots, and they sometimes grow distorted into what is called clubbing. No proposed remedies have been so successful as a clean and careful cultivation, sowing abundance of seed, and encouraging birds which feed on insects. The field husbandry of turnips was familiar to the ancient Gauls, and as garden vegetables they were not unknown to the Greeks and Romans.

TURNIP FLY, a name given to several insects of different orders, but especially to the small chrysomelian beetles of the genus *haltica* (Illig.), which attacks the turnip in its various parts and stages of growth. In the genus *haltica* (Gr. ἁλτικος, skilled in leaping) the body is very convex above, oval, with short thorax and wide head; antennæ slender; hind thighs very thick and formed for leaping; surface of the body generally smooth and shining, and often prettily colored; claws notched and hooked, enabling them to keep firm hold of the leaves of plants on which they feed, especially the cruciferous vegetables, to which they are often very injurious. They are all very small, the largest not more than 2 lines long and 1 wide; most are shining green, tinged with brown or yellowish. The turnip fly of England is the *H. nemorum* (Illig.); it devours the seed leaves of the turnip as they appear above the ground, continuing its ravages all summer; in winter it conceals itself in some dry and sheltered place, laying its eggs in spring on the leaves; the larvæ eat the soft pulpy substance, making little galleries in which they undergo their changes, and in this way are as injurious as the full-grown beetles; they are slender grubs, tapering at each end, with 6 legs, and become perfect insects in a few weeks, a constant succession occurring through the summer. What they lack in size these beetles make up in numbers and voracity; the loss to the turnip crop from their ravages is sometimes considerable, in a single year in Devonshire amounting to half a million of dollars; they like sunny places, and are rarely found in shady fields or beds, cold, shade, and rains being the natural protection against their attacks. The best method of ridding the plants of these beetles is to water the leaves carefully and regularly with a solution of lime or other alkali; sprinkling lime or the dust of chalky roads upon them when wet with dew, the infusion of wormwood, the decoction of walnut leaves, and the smoke of burning straw and weeds will also free the leaves of this pest; the farmers accelerate the growth of the crop as much as possible, keeping them off till the turnip is in the rough leaf, when it is safe. The stages of this insect's growth are fully described in vol. ii. of the "Transactions of the Entomological Society of London," by Mr. Le Keux. The *H. striolata* (Fabr.), the wavy-striped flea beetle of the United States, much resembles the preceding; it is less than $\frac{1}{10}$ of an inch long, shining black, with a broad, wavy, buff stripe on each wing cover, and the knees and feet reddish yellow; it is abundant on the seed leaves of the turnip and other plants early in May, in some seasons threatening to be almost as injurious as the European insect; the same remedies have been found effectual here.—Among the lepidoptera, the *pontia oleracea* (Harris), the potherb or white butterfly, is often called turnip fly. The wings are white or yellowish, dusky near the body; back black, and antennæ blackish with narrow white rings; the expanse of wings about 2 inches. Toward the beginning of June it may be seen fluttering over turnip and cabbage beds for the purpose of attaching 3 or 4 of its eggs to the under side of the leaves; the eggs are yellowish, pear-shaped, ribbed longitudinally, and $\frac{1}{13}$ of an inch long; they are hatched in about 10 days, attain their full size of $1\frac{1}{4}$ inches in 3 weeks, when they are pale green, and eat irregular holes in any part of the leaf; they pass a chrysalis state of 11 days, suspended by silken threads attached to the hind feet and fore part of the body in some protected place; they are again abundant toward the beginning of August, laying eggs for a 2d brood, the chrysalids from which survive the winter, coming out perfect insects in May or June; the chrysalis is $\frac{3}{4}$ of an inch long; the larvæ are eaten by titmice and other insectivorous birds; the chrysalids can be collected on boards placed for them near the ground, and the butterflies are easily caught in bag nets, as they fly low and lazily. This species is rarely found south of the latitude of New Hampshire.—Some dipterous insects, as the flower flies (*anthomyiadæ*), in the larva state infest the roots of turnips, &c., eating also the pulpy parts of the leaves and stem; in this state they closely resemble the maggots of common flies.

TURNSOLE. See Heliotrope.

TURNSPIT. See Terrier.

TURNSTONE, a wading bird of the oyster-catcher family (*hæmatopodidæ*) and genus *strepsilas* (Illig.), so named from its turning over by the strong bill the stones and weeds along the margins of the sea and of lakes and rivers in search of insects, mollusks, and crustaceans which hide beneath them. The only well characterized species, *S. interpres* (Illig.), is about 9 inches long and 18 in alar extent; above it is irregularly variegated with black, dark rufous, and white; head and neck white above, with numerous spots and stripes of brownish black; in front of eyes and on throat white, usually bordered with black; lower parts, back, rump, and under wing coverts, white; quills brownish black, with white shafts; tail white at base and tip, with terminal half brownish black; conspicuous white bar on wings, bill black, and legs orange. The bill is shorter than the head, compressed, obtusely pointed, and slightly bent upward at tip; nasal groove very wide and shallow, for half the length of the bill; legs moderate and stout, with tarsi scaled in front; toes short and not webbed, the hind one touching the ground; wings long, the 1st quill longest; tail moderate and rounded. It is generally seen in small flocks of 5 or 6, sometimes in company with various sandpipers; it is not at all shy, and emits a loud whistling note during flight; in its spring and summer dress it is a very handsome bird; the eggs are 4, 1½ by 1¼ inches, pale yellowish green with a few black lines and irregular patches of brownish red. It is one of the most widely distributed of birds, being found throughout North America on the Atlantic and Pacific shores, in Europe, at the straits of Magellan, Cape of Good Hope, the East Indies, Australia, and indeed in most parts of the world; in Great Britain it comes in August and remains till May, when it goes north to breed. The *S. melanocephalus* (Vig.) differs only in the prevalence of the dark color on the head, breast, and upper parts; it is abundant in western North America, and is probably only a variety of the common turnstone.

TURPENTINE, a liquid or semi-solid oleoresin, which exudes naturally, or through incisions, from the wood of most coniferous trees, such as the pine, larch, and fir; also the thinner liquid obtained from this by distillation, which is more properly known as oil or spirits of turpentine. American turpentine is principally derived from the *pinus australis* (Mx.; *P. palustris*, Willd.), or the "long-leaved pine," which grows very abundantly near the coast in the south-eastern states, especially in the Carolinas and Georgia. The *P. tæda*, loblolly or old field pine, also furnishes turpentine, which is generally less fluid than that from the preceding species; and smaller quantities are derived from some other species. The greater part of the common European turpentine is obtained from *P. sylvestris* (Scotch fir) of N. Europe, and from the *P. maritima*, found in its southern part and along the sea coasts; much of that derived from the latter tree is sold as "Bordeaux turpentine," so named from the port whence it is chiefly shipped. "Venice turpentine" comes from the larch (*larix Europæa*); Canadian turpentine, or "Canada balsam," from the American silver fir or balm of Gilead tree (*abies balsamea*), which abounds in Canada, Nova Scotia, and the mountainous parts of the northern United States; Chian turpentine from the *pistacia terebinthus;* Strasbourg turpentine from the silver fir (*abies picea*), though the same name is often given to the product of the *larix Europæa;* Carpathian and Hungarian turpentines from *P. cembra* and *P. pumilio;* dammara turpentine, or "dammar," from the *P. dammara* of the East Indies; and the Dombeya turpentine from the *Dombeya excelsa* of Chili. There are a few other substances considered as turpentine, of which little is known; and the different turpentines of commerce are undoubtedly often derived in part from other species than those to which they are commonly ascribed. The name turpentine is derived from the Greek *τερεβινθος*, the tree furnishing the turpentine of Chios, the principal variety known to the ancients, and which is mentioned by Pliny.—Turpentine slowly hardens when exposed to the air, partly from evaporation of the more liquid portion, and partly from the resinification of this by oxidation. It softens and liquefies by heating, readily takes fire and burns with a smoky flame, and is completely soluble in alcohol and ether. In its crude state it is applied to very few uses. By the distillation of common crude turpentine with or without water, a volatile product, known as oil or spirits of turpentine, is obtained, and resin or rosin, also called colophony, remains in the still. (See RESINS.) The oil is generally purified by redistillation with caustic alkali, which removes traces of acid and resin. Its formula when pure is $C_{20}H_{16}$. It is a colorless mobile liquid, highly inflammable, with a characteristic, pungent, bitterish taste, and strong odor; should be neutral to test paper; of specific gravity 0.86, with a boiling point about 320° F. (specific gravity of vapor, 4.76); is perfectly miscible with ether and absolute alcohol, less so with ordinary alcohol, and hardly at all with water; dissolves readily the resins, oils, sulphur, and phosphorus, and softens and partially dissolves caoutchouc. It rotates a ray of polarized light to the right or left, according to its origin, that from *P. australis* generally to the right and that from *P. maritima* to the left; but the amount of the rotation is on an average not more than $\frac{1}{72}$ of that produced by quartz. When English oil of turpentine is simply heated in a closed vessel to about 470° F., it is converted into a mixture of several substances of exactly the same composition, but differing very much in their properties, and which may be separated by fractional distillation. The most important of these are isoterebenthene, a colorless liquid having an odor of stale lemons, a specific gravity of 0.843, and a boiling point of 350° F.; and metaterebenthene, a viscous yellowish liquid, with a disagreeable odor, a tendency to rapid oxidation, and a specific gravity of 0.913, which constitutes the residue in the retort after the heat has reached 660° F., forming about one third of the entire quantity of oil distilled, and is volatile without decomposition at a somewhat higher temperature. Both of these rotate polarized light to the left. These modifications may be produced at a lower temperature than 470° F. if the oil be heated with water, or with several of the chlorides, fluoride of calcium, and many organic acids. By the action of sulphuric acid on oil of turpentine, two other modifications, identical in composition, have been obtained: terebene, which boils at the same temperature and has a vapor of the same density as the unmodified oil, but is rather less oxidizable, and has an odor like that of oil of thyme; and colophene, a somewhat viscid liquid, of specific gravity 0.940, and a boiling point of 590° to 600° F., colorless by direct light, but so fluorescent as in some directions to appear of a dark indigo blue, with vapor twice as dense as that of terebene. By decomposing artificial camphor by means of quicklime, two other modifications of oil of turpentine, identical with it in composition, are produced: camphilene, boiling at 273° F., and terebilene. Neither terebene, colophene, camphilene, nor terebilene has any rotatory action upon polarized light. Oil of turpentine forms one liquid and three solid hydrates, and with hydrochloric acid it forms several liquid and solid compounds, the latter having the appearance and smell of camphor, and termed artificial camphors. It very easily oxidizes, and a definite hydrated oxide ($C_{20}H_{16}O$, 2HO) is obtained by placing it in a jar filled with oxygen over water and exposed to sunlight, which forms crystals on the sides of the jar, while strong nitric acid acts so violently upon it as frequently to inflame the mixture. A large number of other organic compounds are also formed by the action of dilute nitric acid, several of the other acids, chlorine, &c., of most of which little is known.—The principal applications of oil of turpentine are in the preparation of paints and varnishes (see Paints, and Varnish), in the India rubber manufacture (see Caoutchouc), as a burning fluid, alone or mixed with alcohol (see Burning Fluid, and Camphene), and as a medicinal agent, used both externally and internally. It is one of the most energetic of the volatile oils; the vapor is quickly destructive to plants, and to those insects which respire by the whole surface, as wasps, lice, fleas, and worms. It appears to act more powerfully on the lower animals than on man, as the skin of the horse is blistered by it much more rapidly than that of man, and 2 drachms are said by Schubart to have killed a dog in 3 minutes, while human beings have taken 3 ounces without serious injury. In moderate doses it acts as a stimulant to the stomach, intestinal canal, liver, and kidneys, and promotes the evacuations of these organs. In chronic affections of the liver, obstructions from gall stones, &c., in chronic rheumatism and sciatica, sometimes in typhus and yellow fever, in Asiatic cholera, scarlet fever, obstinate constipation, many diseases of the urino-genital organs, and many other diseases where a stimulant action is required, it is a medicine of great value, as well as for intestinal worms, which it appears to directly kill, instead of destroying them by removing their means of nourishment. As a liniment for rheumatic and paralytic affections, for burns, &c., it is very useful; and in vapor it has been used as an anæsthetic and a substitute for chloroform. It is much recommended in hæmorrhage from various organs, and in childbed fever.—Common American or white turpentine of good quality is yellowish white, somewhat translucent, of a consistency varying from semi-fluid and very adhesive, though still brittle, in the middle of summer, to hard and dry in winter, and often contains small pieces of bark or wood; and the inferior sorts are harder and darker colored. When fresh and good, it contains on an average 17 per cent. of essential oil. Much was formerly obtained from New England, but for a long time most of the supply has been derived from North Carolina and S. E. Virginia, and later from South Carolina, Georgia, Alabama, and Florida. The product of turpentine in North Carolina was estimated a few years ago at 800,000 bbls., of which 200,000 were exported in the crude condition, and the remainder distilled in the state. For full particulars of value, mode of collecting, &c., see Carolina, North. In Georgia and Florida the annual product was estimated at the same time at 80,000 bbls.; and in Alabama, where the manufacture was commenced only a few years ago, the production, according to a recent estimate, was upward of 1,600,000 galls. of spirits of turpentine, with a residue of over 130,000 bbls. of rosin. The exports of spirits of turpentine from the United States in 1860 amounted to 4,072,023 galls., valued at $1,916,289, and of crude turpentine and rosin to 770,652 bbls., valued at $1,818,238. They are sent to nearly all parts of the commercial world, but the largest quantities are taken, in the order named, by England, Holland, Belgium, Hamburg, Bremen, Chili, Ireland, Brazil, and Cuba. The import of crude turpentine into England in 1858 was 12,823 tons, or about 86,260 bbls., and in 1859, 12,833 tons, or 89,832 bbls.—Common European or Bordeaux turpentine is collected by simply making incisions in the trunk or removing portions of the bark, and collecting the juice in small troughs or in holes dug at the foot of the tree; and it is purified by heating and straining through straw, by exposing it to the sun in a barrel with holes in the bottom, or by heating it with steam in bags, through which the melted turpentine escapes. Thus prepared, it is whitish and turbid, and separates upon standing into two parts, one liquid and transparent, the other of the consistence and appearance of honey; and the commercial article often consists wholly of this latter portion. The substance called by the French *galipot* or *barras* is that part of the turpentine which concretes upon the trunk of the tree, and is removed during the winter; and this, when purified by melting in water and straining, is called white, yellow, or Burgundy pitch. (See Pitch.) Venice turpentine, so named because formerly an important article of Venetian commerce, is obtained by boring a hole in the spring into the heart of the tree, about 2 feet from the ground, in which a wooden gutter is inserted. It is a viscid liquid, of the consistence of honey, with a yellowish or slightly greenish color, a more agreeable smell than common turpentine, and a very acrid taste. Most of what is sold as Venice turpentine, however, is said to be prepared by dissolving rosin in oil of turpentine, is very brown, and appears to be made chiefly in the United States. Strasbourg turpentine is procured, according to Duhamel, by climbing to the top of the loftiest pines by means of spiked shoes, one hand of the collector being employed to sustain him, while the other holds a cow's horn or tin instrument of the same shape, with which he breaks the tumors, and soon fills the horn, which he then empties into a tin plate bottle slung at his girdle. This is done both in spring and autumn. The product is then filtered through the leaves of the *pinus excelsa*, and placed in a funnel made of the bark of the same tree rolled up. It is very transparent, almost colorless, and in France is very frequently employed in medicine. Canada balsam (see BALSAMS) is often sold for Strasbourg turpentine in the shops. It is used in medicine, by opticians for mounting microscopic objects, &c., and for some other purposes. Chian or Cyprus turpentine is chiefly obtained from the islands of Chios and Cyprus, where incisions are made in the summer in the bark of the *pistacia terebinthus*, from which the sap falls upon smooth stones placed at the foot of the tree, and is afterward strained. It is a greenish white, transparent, tenacious liquid, of about the consistence of honey, with an agreeable odor and but little taste. As the annual product is small, it bears a high price, and is often adulterated. Carpathian turpentine, or Riga balsam, exudes from the extremities of the young twigs of *P. cembra*, to which flasks are suspended; it is a white, thin liquid, with an odor like that of juniper, and is employed as a medicine. Hungarian turpentine or balsam is obtained in the same manner from *P. pumilio*. The Riga and Hungarian balsams are but rarely brought to the United States. The dammara turpentine, which is employed in ship building and for a great variety of other purposes in the East Indies, soon concretes into a very hard rosin. The turpentine of the *Dombeya excelsa* is a glutinous, milky-looking fluid, with a strong odor and taste.

TURPIN, TULPIN, or TILPIN, archbishop of Rheims, a friend and companion of Charlemagne. He was originally a Benedictine monk of the convent of St. Denis, but about 753 was made archbishop, and is said to have died about the beginning of the 9th century. His celebrity is due to the fact that his name is prefixed to a Latin chronicle, which relates the expedition of Charlemagne against the Saracens of Spain and the fight of Roncesvalles. It is uncertain whether the real author's name was Turpin, or whether it was a forgery. The work is, however, among the earliest productions relating to the events of Charlemagne's reign, and from it the tales of chivalry of the middle ages were largely taken. It was translated from Latin into French in 1206 by a clerk of Renaud, count of Boulogne. The original was first printed in the collection of Schardius (fol., Frankfort-on-the-Main, 1566).

TURQUOISE, a precious stone, colored by oxide of iron and oxide of copper, of the following composition: phosphoric acid, 30.9; alumina, 44.5; water, 19. It does not crystallize, has a waxy lustre, and varies in color from blue to green. Hardness 6, or like feldspar; specific gravity 2.6 to 2.83. Nearly all the turquoises used in jewelry come from mines in Khorassan, about 40 m. W. of Nishapoor, which are crown property, and in 1821 yielded a revenue of about $13,500. The gems are found in nodules and crusts in a porphyritic rock. The chief seat of the turquoise trade is at Meshed, where most of them are cut. The finest are generally reserved by the shah of Persia for his own use; the next in quality go to India, and those rather inferior to Persia, Turkey, and Russia. The imperfect ones, with white specks, are principally bought by the Arabs, who use them as amulets, generally setting them in rings of plated tin. A turquoise 2 inches long, said to have been a talisman belonging to Nadir Shah, and with a verse of the Koran engraved on it, is in the possession of a jeweller of Moscow, who values it at $3,800. In the exhibition of 1851 was a collection of more than 200 turquoises obtained in 1849 by Major Macdonald from new localities in the mountains of Arabia Petræa, where they occur in nodules in a reddish sandstone. They differ in their shade of blue from the Persian stones, but agree with those found in Abyssinia by M. d'Héricourt. Common varieties are found in Saxony and Silesia; and there is a turquoise quarry in New Mexico. (See CHALCHIHUITL.) The turquoise is much esteemed as a gem, particularly in Persia and Russia. Many magical properties have at various times been supposed to belong to it, and an old superstition, not yet quite extinct even in Europe, holds that it loses its color during the illness of its possessor, and regains it with his convalescence. The so called "occidental" or "bone" turquoise is only fossil bone colored by oxide of copper or phosphate of iron. It is brought from Siberia and France, but is not worth more than one fourth as much as the real stone. It may be distinguished by being internally foliated and streaked, and by not taking so high a polish. The turquoise is said to be now imitated in so perfect a manner as to be with great difficulty distinguished from the genuine, which is however harder.

TÜRR, ISTVÁN, a Hungarian general, born in Baja, in the county of Bács, about 1815. He volunteered in the Austrian army, became a sergeant major in the regiment of the archduke Francis Charles, served through the first Italian campaign in 1848, and was promoted to be sub-lieutenant. In Jan. 1849, he deserted to the revolutionists, and was commissioned by King Charles Albert to raise a Hungarian legion, which he commanded at the disastrous battle of Novara. After that defeat he withdrew to the grand duchy of Baden, and was there made a colonel in the revolutionary army. Escaping to England on the suppression of the insurrection, he entered the British service at the outbreak of the Russian war, received a commission in the Anglo-Turkish legion, and in 1855 was sent by the government to the Crimea to purchase horses for the army. Arriving at Bucharest, he found that place occupied by the Austrian regiment from which he had deserted in 1849; and although wearing the British uniform, he was arrested, sent to Hermannstadt, and condemned to death by a council of war. Liberated after some difficulty by the intervention of the English government, he returned to Turkey in 1856, and was preparing for an expedition into the Caucasus when a severe attack of hæmorrhage obliged him to retire from active service. On the commencement of the Italian war of 1859 he joined Garibaldi, and at the head of a battalion of the *cacciatori delle Alpi* distinguished himself in the engagements of Varese and Castel-Nedolo, receiving in the latter a severe wound in the arm. Though not entirely recovered, he took part in the expedition to Sicily in May, 1860, as aid to Garibaldi, was engaged in all the chief movements of the campaign, was wounded again at the taking of Palermo, displayed great bravery at Melazzo, commanded a division before Messina, and accompanied his chief to the mainland. He had an important share in the organization of the South-Italian army, and was one of the principal authors of the annexation of Naples to the kingdom of Italy. In 1861 he married Mlle. Wyse-Bonaparte, a granddaughter of Lucien Bonaparte. He is now (May, 1862) general of division in the Italian regular army.

TURRETIN, François, a Swiss theologian, born in Geneva, Oct. 17, 1623, died there in 1687. He visited Holland and France in his youth, studied under Spanheim, Morus, and Diodati, and on his return in 1647 was ordained pastor at Geneva. In 1650 he removed to Leyden, but in 1653 was recalled to Geneva to become professor of theology. He published *Institutiones Theologiæ Elenchticæ* (Geneva, 1679–'85), a work still regarded as one of the clearest and most satisfactory statements of the Calvinistic doctrines. His complete works were published at Geneva in 1688 in 4 vols. 4to.—Jean Alphonse, son of the preceding, born in Geneva in 1671, died there, May 1, 1737, became professor of ecclesiastical history at Geneva in 1705, and published *Écrits sur la vérité de la religion Judaïque et de la religion Chrétienne* (5 vols. 8vo.), an abridgment of ecclesiastical history, &c.

TURTLE, the name popularly applied to the marine chelonian reptiles, equivalent to the sub-order *chelonii* (Oppel), including the families *sphargididæ* and *chelonioidæ;* in these the dermal ossification is imperfect, and the limbs preserve through life the fingers undivided, as in the embryos of the higher families of the sub-order *amydæ* or tortoises. For the characters of the order see Testudinata. The word turtle in Saxon meant turtle dove, a bird and not a reptile; and the English word had the same signification until the discovery of America, when sailors gave the name of turtle or turkle to the marine chelonians of the West Indies. As distinguished from the *amydæ* (see Tortoise), the turtles have the limbs converted into large, flattened, fin-like organs, the toes completely concealed by a common skin, the anterior pair always considerably longer than the posterior, and both frequently furnished with one or two nails on the outer margin, sometimes disappearing with age; the body is flattened to facilitate their progress through the water; swimming is performed almost entirely by the anterior limbs, the posterior moving independently and used chiefly to balance the body and guide its course; the anterior are raised and depressed together very much like wings, and have a free sweep up and down and forward and backward; on land they move slowly and awkwardly by means of the front limbs, projecting them forward and dragging the body up to them, assisted greatly by the nails; the bulk of the body is forward, where are the principal muscular masses; the humerus is very short, the forearm longer, and the hand longest; the humerus reaches forward and the rest of the limb backward, while in birds the former is directed backward, the forearm forward, and the hand again backward, the main surface of the wings being between the last two; the pelvis and hind legs are small. The head and limbs cannot be retracted under the shield as in the tortoises, and the plastron is less perfectly ossified and connected with the carapace; the ribs are narrowed toward the end, and the spaces between them at this point and the bony plates of the plastron are separated by intervals filled up by cartilage; the head is flattened above, protected by large plates; the jaws are strong and firmly articulated, horny, very sharp and beak-like, and the eyes large and prominent; the head is so placed on the neck as to allow the nostrils to be easily raised above the surface for respiratory purposes, their openings being closed by a fleshy valve. Much sea water is swallowed with their food, and when the former is of necessity regurgitated the latter is retained by the numerous horny processes, pointing backward, with which the œsophagus is furnished. The very young are longer in proportion to their width, and grow gradually broader. Though lower than the tortoises, the turtles exhibit features resembling those of birds in the form of the anterior limbs, the mode of locomotion, the preponderance of the fore part of the body, bill-like jaws, and overlapping epidermic appendages. All are marine, excellent swimmers, and rarely approach the shore except to deposit their eggs; some feed entirely on sea weeds, but a few eat mollusks, crustaceans, and other aquatic animals; they are generally timid, and make but little resistance, though they are more bold and regardless of danger in the pairing season. The flesh of the herbivorous species is a delicious and wholesome food, and much sought after by epicures, while that of the carnivorous is disagreeable if not positively injurious; the callipee, or under part of the breast and abdomen, is considered the choicest part; the liver and fat are also much esteemed. They come on shore toward the end of spring to lay their eggs on the sandy beaches above high water mark; they generally select desert islands or keys, and a still moonlight night; they dig a trench in the sand by their hind feet about 1½ feet deep, and deposit therein about 100 eggs at each of 3 sittings, with an interval of 2 or 3 weeks between them; the eggs are lightly covered with sand, and left to be hatched by the heat of the sun; if undisturbed, they return to the same shore year after year. They are caught on the shore, being turned on their backs, a position from which they cannot escape owing to the flatness and width of the shell; they are harpooned and taken in nets in the water, and in the Indian seas are captured by means of the *remora*. (See SUCKING FISH.)—In the *chelonioidæ* the body is widest about midway, and the vertebral column descends constantly and gently to the tail; the shoulders and hind limbs are better protected than in the other family; the shield is more or less heart-shaped, with the posterior angle not prolonged into a point extending far over the tail; all the genera are represented on the coast of the United States, and are far less rapid swimmers than the *sphargididæ*. The latter family has only the single genus *sphargis* (Merrem), showing well the inequality of the natural groups called families; the body is more conical than in the other turtles, the carapace leaving the hind legs as well as the shoulders and neck much exposed from its great contraction behind and in front; the lower parts are equally unprotected by the plastron, this with the carapace forming little more than a wide girdle around the thorax and abdomen; the skeleton is light, the paddles large and free, and every thing seems arranged for rapid and long continued voyages.—The green turtle (*chelonia Mydas*, Schw.), sometimes attaining a length of 5 or 6 feet and a weight of 5 or 6 cwt., received its name from the color of the delicate fat which enriches the soup and other dishes of a course of turtle. It has a short and rounded snout, and jaws acting like straight-edged shears cutting from behind forward, the upper slightly notched, the lower with a deeply serrated margin and a hook in front; shell smooth, with 13 plates, 5 vertebral and 8 lateral, not imbricated, slightly notched and serrated behind, and with 25 marginal plates; anterior limbs rounded at shoulder, covered with a tough skin and a few small plates; forearm and hand with large plates on the anterior border, smaller ones elsewhere, and an extensile fold of skin along the posterior margin; hind limbs short and flattened, covered with small plates and a larger fold of skin on the margin; a single nail to each limb; the shell is light brown, with darker lines and blotches, and sometimes with a greenish tinge; below pale yellowish white. It is abundant in the tropical waters of America, whence great numbers are carried alive to the northern states and to Europe; the West Indies are its head-quarters, whence it wanders to the gulf of Mexico and the coasts of Guiana and Brazil; it is rarely found above lat. 34° N. on the Atlantic coast, and never on the shores of Europe; the Tortugas islands are a favorite resort. It browses on the turtle grass (*zostera marina*), eating the succulent part nearest the root, the rest rising to the surface and disclosing the feeding grounds to the practised eye; in confinement it will eat and grow fat upon purslane (*portulacca oleracea*); numbers are kept for a long time in pens or crawls filled at every tide. It is often seen many hundred miles from land, and is easily taken when asleep on the surface; its capture gives employment to many and food to thousands in the West Indies; for an interesting account of some other methods of taking them, and of the manner in which the eggs are laid, the reader is referred to Audubon's "Ornithological Biography," vol. ii. pp. 370–'76 (Boston, 1835); during the actual laying of the eggs nothing can disturb their labors; they are hatched in 8 or 9 weeks. The flesh is exceedingly delicate, and, when not rendered indigestible by the ingenuity of cooks, is wholesome in moderate quantities; the eggs of this and of all the species are also considered a delicacy. In the young the carapace is relatively the narrowest, and the colors of the adults vary much. The *C. virgata* (Schw.), mottled with brown and greenish, and with a more elevated and arched back, is found on the California coast and on the Pacific; the common species is said also to occur at the Cape Verd islands and on the Atlantic coast of Africa. As in all the species, the eggs are dropped one by one, and disposed in regular layers, during a period of about 20 minutes; they are round, 2 to 3 inches in diameter, with the external membrane flexible, very white, and containing a considerable quantity of calcareous matter; the shell of the young is soft, and affords but little protection against birds of prey on land and predaceous fish and alligators in the water.—The loggerhead turtle (*thalassochelys caouana*, Fitz.) has the body very wide across the shoulders; the head very large and flat, with wide mouth, the upper jaw nearly straight, and the lower hooked; shell smooth, with a keel along the median line, and a crescentic notch in the posterior border; the plates are thin and flexible, 5 vertebral and 10 lateral, not imbricated, and the marginal plates 25; each limb has 2 nails, corresponding to the first 2 fingers; the color above is light brown, sometimes with an olive tinge and often bordered with dirty yellowish; and the shield, as in the other turtles, is frequently more or less covered with barnacles, serpulæ, and other parasites. It has an extensive range on the American coast of the Atlantic, from Virginia to Brazil, and probably on the shores of Europe and in the Mediterranean; it is more common than the green turtle, and grows to a large size, even to 15 or 16 cwt.;

it is voracious, feeding principally on mollusks, being able to crush with its powerful jaws the strongest conch and helmet shells (*cassis*); the flesh of the young is sometimes eaten, but that of the old is rank and tough; the scales are of little value, and even the eggs have a musky flavor; it is taken only for the considerable quantity of excellent burning oil which it furnishes. The *T. olivacea* (Ag.) is found in the Pacific.—The hawk's bill or imbricated turtle (*eretmochelys imbricata*, Fitz.) has a low and rather wide head, a long and narrow mouth, the upper jaw prolonged and hooked like the beak of a hawk, the lower jaw with a smaller hook, and both with serrated margins; the shell is slightly keeled, flattened and serrated behind, with 5 vertebral and 8 lateral plates strongly imbricated or overlapping like the scales of a fish; the plastron has 2 keels, more or less worn off by age; there are 2 nails to each limb; anterior limbs very long and wing-like; the head is protected by 14 scales; the tail is conical, not extending beyond the shell. The color is yellowish above, marbled with rich chestnut brown, and yellowish white below; in the young there is a black spot on the 4 posterior pairs of plates. It is found in the West Indies, the gulf of Mexico, on the coasts of Guiana and Brazil, and has even strayed to the Mediterranean; the *E. squamata* (Ag.) is found in the Pacific and Indian oceans, the best being taken about the Moluccas and New Guinea. The food consists of sea weeds, crabs, mollusks, and fishes; in confinement it is more fierce than the preceding two; it rarely grows more than 3 feet in length; its flesh is indifferent, and it is said unwholesome, though the eggs are good, and the species is sought after only for its beautiful horny plates, which constitute the tortoise shell of commerce. The plates are softened by warm water, and by means of this and strong compression can be bent into any shape, even the parings being thus agglutinated and turned to account; they are not considered of value unless from an animal weighing at least 160 lbs., as otherwise they are too thin; 15 lbs. of shell from a single one is a large amount, and yet in animals of the same size the imbricated would be worth when taken 10 times as much as the green turtle. Singapore and Canton are the great marts for tortoise shell. Its ornamental uses for boxes, combs, furniture, and fancy articles are well known; it was consumed in large quantities in ancient Rome, even the door posts of the rich being inlaid with it; the carapace was used as a cradle and a bath tub for children, and as a shield for warriors.—The leathery or trunk turtle (*sphargis coriacea*, Merr.) is so named from having the carapace overlaid by a leathery skin instead of horny plates, smooth in the adult, but tuberculated in the young, and with 7 longitudinal ridges; the head is large, narrowed in front of eyes, with small and circular nostrils, and large eyes with lids opening nearly vertically; jaws very strong and sharp-edged, the upper with 3 notches, the hook of the lower shutting into the central one; neck short and very thick; anterior limbs twice as long as the hind ones, the former falcate, the latter the widest; tail sharp, compressed on the sides, and not extending beyond the shell; the color is dark brown above, with lighter spots along the ridges. It is the largest of the turtles, attaining a length of 8 feet and a weight of more than half a ton; its food consists of mollusks, crustaceans, fish, sea urchins, and marine plants; its flesh is of no value, but its shell has been used along the Mediterranean for making small boats, drinking troughs for animals, and children's bath tubs. It is found on both sides of the Atlantic, especially in the tropics, coming north as far as Massachusetts bay, and following the Gulf stream across the Atlantic to the coasts of Europe and the Mediterranean; those of E. Asia and S. Africa may perhaps be a different species; none of this genus have nails on the limbs. It was known to the ancients, and with the Greek tortoise disputes the claim of the original of Mercury's lyre, Lacépède supposing that its dried carapace and tendons were used by the Greeks in the construction of this musical instrument; the longitudinal ridges on the elongated heart-shaped back, according to Shaw, suggested the name luth or lute given to it in some countries.—The marine species have the same tenacity of life under mutilation and deprivation of food, as has been noticed in the tortoises. Turtles are found as far back as the jurassic period, continued through the cretaceous, becoming more abundant and advancing further north than at the present day, though they were not so large as the existing species; in the limited strata of the eocene clay of the island of Sheppey more species have been discovered than now exist, another proof of the higher temperature at that epoch; large species have been found in the tertiary of South Carolina and the greensand of New Jersey, of yet undetermined genera.

TURTLE DOVE, the common name of several small pigeons, especially of the genera *turtur* and *œna*, characterized by a smaller size than the domestic pigeon, weaker bill, longer toes (the inner exceeding the outer), and a longer and wedge-shaped tail; they are both arboreal and terrestrial in habit, feeding on the ground, but roosting and nesting in trees. The word turtle signified a dove until the discovery of America, when it was applied to the marine tortoises. In the genus *turtur* (Selby) the bill is slender and straight, with the tip slightly arched and acute; wings long, the 2d and 3d quills the longest; tail moderate, rounded or even; tarsi almost as long as the middle toe, for the most part naked, and the toes long and slender. There are more than a dozen species, found in various parts of Europe, India, and Africa, in woods and jungles, making their presence known by their pleasant cooing; from Europe they migrate to the south in winter; they are generally seen in flocks of about 20, in open cultivated districts, feeding on grain, seeds of grass, &c.; the nest is made in thick woods, of small twigs loosely put together, and the eggs are two. The common European turtle dove (*T. auritus*, Selby) is 11 inches long; the head, neck, breast, and back are wood-brown tinged with pearl-gray; a patch of black feathers margined with white on each side of the neck; scapulars and wing coverts black, shading into grayish; and edged with buff; lower parts white, as are the tips of the tail feathers except the two middle ones. It arrives in temperate Europe in May, leaving at the end of summer; it is found also in Asia and Africa, and is only a rare visitor to Great Britain; it has been supposed to be the origin of some of the smaller partly domestic varieties which are kept only in aviaries. The collared turtle dove (*T. risorius*, Selby) is 10 inches long; the general colors are different shades of pale wood-brown, with even paler edgings, tinged with vinaceous on the under parts, and with a half collar of black on the hind neck. It is found wild in most parts of Africa, but is now widely distributed as a cage bird; many of the representations in ancient works of art, where the dove is figured as the emblem of tenderness and affection, or as the attendant of the goddess Venus, are accurate likenesses of this species, which has been kept in aviaries from remote ages. If left at liberty, it flies away, and does not seem capable of domestication like the common pigeon; in warm climates 7 or 8 broods are raised in a season; it produces a sterile progeny with the *T. auritus*. It is doubtless the turtle of the Scriptures, and is still numerous in Egypt and Asia Minor, deriving its specific name from a fancied resemblance of its cooing to a human laugh. It is so abundant at Constantinople, that it is said the Turkish government allows a certain percentage in the duty on corn on account of the quantity devoured by the turtles in its transit in open vessels to the granaries and mills.—In the genus *œna* (Selby) the bill is moderate and very slender, the wings long with the first 3 quills nearly equal and longest, and the tail of 12 feathers, very long and wedge-shaped, with the 2 middle feathers narrowed. The Cape turtle dove (*Œ. Capensis*, Selby) is 10 inches long, of which the tail is more than one half, the closed wings reaching to about one third the length of the tail; in the male the forehead, chin, throat, and upper breast are intense black; crown, sides of neck and body, and lesser wing coverts pale French gray; middle of abdomen white; back pale brown; wings deeper brown, with a few metallic purple spots; 2 black bars on the rump; middle tail feathers grayish brown, with terminal half black, and the rest bluish gray with a broad black band near the tip; bill and feet yellow. It is seen on trees bordering the rivers of S. Africa, making its nest in low bushes.—In North America is found the Carolina turtle dove (*zenaidura Carolinensis*, Bonap.), about 12¾ inches long and 17½ in alar extent; the bill is weak and black; the wings pointed, with the 2d quill the longest, and the 1st and 3d nearly equal; tail longer than the wings, much graduated and wedge-shaped, and of 14 feathers; though much smaller, it resembles the passenger or wild pigeon in its lengthened tail, and was formerly ranked with it in the genus *ectopistes* (Swains.). It is bluish above mixed with light brownish olive, the former purest on the crown, wings, and upper surface of tail; the rest of head, sides of neck, and under parts generally light brownish red, purplish on breast, becoming brownish yellow behind; patch of metallic purplish on the sides of neck; sides of body and under surface of wings light blue; black spots on wings, and patch of same below ears; tail above with a subterminal black bar and light tip; feet yellow; the female is smaller and less reddish below. It is found all over the United States and in Cuba, and from ocean to ocean; it is rare in the British Atlantic provinces, though common on the Columbia river. The flight is extremely rapid and long continued, but not at a great height, and accompanied by a whistling noise; it walks with ease and grace, and runs swiftly; it seldom bathes, but drinks by swallowing water in long draughts, with the bill deeply immersed; it is rather shy, and difficult to shoot from the rapid flight; 200 or 300 constitute a large flock, which scatter over so large a space that it is not easy to kill more than one at a shot, except in winter when they come near farm houses; the flesh is excellent, and great numbers are killed in the southern states in winter. In Louisiana they begin to lay by the last of March, but in New England not before the middle of May; the nest is made in any kind of tree, and is very loosely constructed; it breeds in aviaries, raising several broods in a season. The eggs are 2, 1¼ by ¾ inch, equally rounded at both ends, and pure white.—None of the turtle doves commit serious depredations in the fields of grain, as they are rather gleaners than reapers. The family characters have been given under PIGEON.

TUSCALOOSA, a W. co. of Alabama, intersected by the Black Warrior and Sipsey rivers; area, 1,620 sq. m.; pop. in 1860, 23,206, of whom 10,145 were slaves. The surface is hilly and the soil highly fertile. The productions in 1850 were 626,452 bushels of Indian corn, 50,271 of oats, 114,035 of sweet potatoes, and 73,561 bales of cotton, the largest growth of cotton in any county of the Union. There were 5 tanneries, 2 cotton factories, 1 paper mill, 3 newspapers, 53 churches, and 404 pupils attending public schools. Iron ore, bituminous coal, and carboniferous limestone are found.—TUSCALOOSA, the capital of the county, and formerly of the state, is situated on the left bank of the Black Warrior river, at the head of steamboat navigation, 125 m. N. W. from Montgomery; pop. in 1860, 3,989. It is the seat of the university of Alabama, and of the state lunatic asylum. The university buildings are elegant and costly. It carries on an active trade in cotton, and has iron and cotton manufactories.

TUSCANY (It. *Toscana*), a division of central Italy, formerly an independent grand duchy, bounded N. W., N., and N. E. by Modena and the Romagna, E., S. E., and S. by Urbino, Perugia, Orvieto, and Viterbo, and S. W. and W. by the Mediterranean sea. In the new kingdom of Italy it comprises the 7 provinces of Arezzo, Florence, Grosseto, Leghorn, Lucca, Pisa, and Sienna, that of Leghorn including the island of Elba; area, 8,712 sq. m.; pop. in 1860, 1,815,243. The principal cities and towns are Florence, the capital, Leghorn, Lucca, Pisa, Sienna, and Arezzo. In the S. the coast is indented by several bays, but in the N. it forms one long continuous sweep without harbors. The shore, though occasionally bold, is for the most part low and swampy. In the interior the country presents 4 different regions: the highlands of the Apennines on the N. and N. E.; the hilly tract which occupies nearly the whole of the province of Sienna; the valleys of the principal rivers; and the plains which border the Maremme or marshes on the west. The Apennines have none of their principal heights within the limits of Tuscany, the most elevated point being the Bosco Lungo, on the borders of Modena, 4,200 feet above the sea; few of the other summits are more than half this height, and the average elevation is estimated at 1,900 feet. With the exception of a small portion of the N. E., belonging to the Adriatic, the whole drainage of the surface flows to the Mediterranean by numerous streams, the most important of which are the Arno, Cecina, Ombrone, Albegna, Fiora, and Tiber, the last of which, however, has only the upper part of its course in Tuscany.—In the more elevated parts of the country the climate in winter is severe, and snow often lies for a month; but in the valleys vegetation is scarcely interrupted. At Florence the average temperature is 59°, and the sirocco is not uncommon. Fevers, dropsy, and several other complaints are common in the marshy tracts, particularly in the autumn, when these districts are almost entirely deserted by the inhabitants. The other parts of the country are particularly healthy, the ratio of deaths in some years not exceeding 1 in 40 of the population, and never exceeding 1 in 36.—Some of the loftier summits are barren, but in general all the land which, from its elevation or the unevenness of its surface, cannot be cultivated, is covered with forests and natural pastures. About ¼ of the area is clothed with forests and plantations of chestnuts, and about the same extent with pastures; while ⅛ is planted with vines and olives, and the remainder is arable land. Agriculture is more advanced than in any other part of Italy except Lombardy, but is still in a backward state. The principal crops raised are rice, barley, rye, pulse, maize, and wheat, a peculiar species of the last being cultivated solely for its straw; but the quantity of grain produced is not sufficient for the wants of the inhabitants. A good deal of attention is paid to the culture of the vine, and in many places where the hills are naturally steep artificial terraces have been made on which it thrives well. The olive is extensively cultivated, but the quality of the oil produced is not very good. Various kinds of fruit are abundant; the mulberry thrives, and the annual produce of silk is estimated at 250,000 lbs. Large numbers of sheep are fed on the highlands in summer and in the marshes during the autumn and winter; and a considerable quantity of cheese is made from the milk of ewes and goats. The asses of Tuscany are very large; and a great number of pigs are fed upon acorns in the woods of the Maremme. The manufactures consist of woollen and silk goods, hemp and linen cloth, paper, glass, leather, wax, hardware, china and earthenware, alabaster ornaments, coral, which is gathered on the coast of Barbary and worked at Leghorn, and straw plait, of which however the quantity made has greatly declined. A considerable trade is carried on, the chief exports, in addition to several of the articles just enumerated, being oil, timber, charcoal, raw and spun silk, potash, hides, cheese, borax, tartar, gall nuts, and tallow.—The inhabitants are generally honest, sober, and industrious. The Roman Catholic is the established religion, and the total number of the clergy is about 15,000, but all denominations enjoy equal political rights. In the large towns there are about 7,000 Jews. The church establishment of Tuscany consists of 4 archbishops, those of Florence, Lucca, Pisa, and Sienna, and about 20 bishops. There are universities at Pisa and Sienna, attended together by about 800 students. The people are better educated in Tuscany than in any other part of Italy.—The greater part of ancient Etruria is included in Tuscany. (See ETRURIA.) After the fall of the Roman empire it became a province of the kingdom of the Goths, next of the Lombards, and then of the empire of Charlemagne, who governed it by counts. These afterward assumed the title of marquis, and as vassals of the empire continued to rule till 1160, when the last of them sold his marquisate to the emperor Frederic I. It subsequently became divided into a number of small fiefs; and the cities of Florence, Pisa, and Sienna each became the centre of a celebrated republic. Florence, having conquered Pisa, became the predominant power of Tuscany. After the fall of that republic in 1532 Charles V. appointed Alessandro de' Medici, an illegitimate son of the duke of Urbino, duke of Florence. In 1569 the whole of Tuscany became united under the Medici family, when Cosmo I. assumed the title of grand duke. This family maintained one of the most brilliant courts in Europe, and distinguished themselves by their patronage of literature and art. They became extinct in 1737, and according to agreement between the great powers were succeeded by Francis, duke of Lorraine, who had married Maria Theresa, heiress of Charles VI. of Austria; and while he resided at Vienna Tuscany was governed by a regency. In 1765 Francis (II. of Tuscany and I. of Germany) died, and was succeeded as grand duke of Tuscany by his second son Leopold I., under whom the country made considerable advances. Leopold having succeeded to the Austrian dominions (1790), the grand ducal crown devolved upon his second son Ferdinand III., who followed the enlightened system of his father. In the war of the French revolution he remained neutral, but this was not regarded by the French, and in 1799 the directory ordered the country to be occupied by its troops. By the peace of Lunéville in 1801 Tuscany with Parma was called the "kingdom of Etruria," and given by Napoleon to the prince of Parma as a compensation for territories of which he had been deprived; but in 1807 it was united to the French kingdom of Italy, and Napoleon's sister Elisa, the princess Bacciochi, was placed at the head of the administration with the title of grand duchess. In 1814 Tuscany was occupied, in the name of Ferdinand III., by the allied troops; and in the following year, at the congress of Vienna, Elba and some other territories were annexed to it, and the possession confirmed to Ferdinand and his successors. The duchy of Lucca was conditionally assigned to Maria Louisa, ex-queen of Etruria, and reverted to Tuscany in 1847. Ferdinand's son and successor Leopold II. followed the example of Naples in March, 1848, and granted a constitution to the people, but becoming alarmed afterward fled to Sienna and subsequently to Gaëta. The members of the provisional government assembled at Florence proclaimed a republic, March 18, and the national assembly that met on the 28th named Guerrazzi dictator. The constitutional party succeeded in driving the republicans from power without bloodshed, and invited Leopold to return without calling in the assistance of the Austrians. This request he promised to comply with, but an Austrian division under Gen. D'Aspre soon afterward arrived, by secret convention, and under their protection the grand duke returned to Florence in 1850 and suppressed the constitution. The people remained quiet until April 27, 1859, when a popular demonstration, immediately following the outbreak of the Italian war of that year, caused the grand duke to offer them a constitution. As they placed no faith in his promises, it was suggested that he should abdicate in favor of his son. This he refused to do, and on the same day left Florence for Bologna. A provisional government was immediately formed, which conferred the dictatorship on the king of Sardinia, who appointed a commissioner to govern the country during the war with Austria. A national assembly met Aug. 20, 1859, and voted to annex Tuscany to Sardinia. The question was afterward submitted to the people, and their approval of the annexation was almost unanimous.

TUSCARAWAS, an E. co. of Ohio, intersected by the Tuscarawas river; area, 520 sq. m.; pop. in 1860, 32,463. The surface is undulating and the soil fertile. The productions in 1850 were 350,778 bushels of wheat, 402,761 of Indian corn, 278,500 of oats, 504,178 lbs. of butter, 68,096 of tobacco, and 176,200 of wool. There were 18 grist mills, 38 saw mills, 2 iron founderies, 5 woollen factories, 16 tanneries, 87 churches, 3 newspapers, and 6,927 pupils attending public schools. Iron ore and bituminous coal abound. The Steubenville and Indiana railroad and the Ohio canal pass through the county, and the Tuscarawas branch of the Cleveland and Pittsburg railroad terminates at New Philadelphia, the capital.

TUSCARORAS, a tribe of North American Indians, who at the settlement of North Carolina occupied a tract of land along the banks of the Neuse and Tar rivers, and the country adjacent. They lived for a long time on peaceful terms with the settlers, and in 1708 had 15 towns on the upper waters of those rivers, and could bring into the field 1,200 warriors. Becoming jealous at length of the encroachments of the whites, they formed a league with the Pamlico Indians, and in 1711 attacked the settlers on the Roanoke; 112 of the whites were butchered in the first attack, and a war of attack and reprisal was carried on between the settlers and the Indians for more than 18 months. In March, 1713, the settlers pursued them to their fort on the Neuse in the limits of the present Greene co., and after a severe battle carried the fort, taking 800 captives, while about 300 were killed. This severe defeat, and the subsequent zealous pursuit of those who had escaped, broke the spirit of the Tuscaroras; they entered into a treaty of peace with the governor, and a tract of land on the Roanoke in the present county of Bertie was granted them for a settlement. The hostility of the settlers, however, made their residence uncomfortable, and not long after they joined their kinsmen the Iroquois in the vicinity of Oneida lake. They were formally received into the Indian confederacy about 1722. For a long time they remained quiet, or only aided in the enterprises of the other tribes without being specially identified; but in the revolutionary war a part of them, under the influence of Sir John Johnson, became allies of the British government, while another portion took sides with the colonists. In the outrages and massacres of that period in the region watered by the Mohawk and its tributaries, they bore their full part. In 1779 those who were the allies of the English removed to Niagara co. to obtain means of living, and were granted a small tract of land there by the other tribes. About 1804 they disposed of their lands in North Carolina and purchased a tract from the Holland land company. These lands are still held by them, and the remnant, about 50 famlies, still remain there, and have adopted the habits of civilization and become industrious and intelligent agriculturists.

TUSCOLA, an E. co. of the S. peninsula of Michigan, bounded N. W. by Saginaw bay and intersected by the Cass river; area about 700 sq. m.; pop. in 1860, 4,886. The surface is level, the soil productive, and timber is abundant. Capital, Vassar.

TUSCULUM. See Frascati.

TUSSER, Thomas, an English poet, born at Rivenhall, near Witham, Essex, about 1515, died in London about 1580. He became a chorister in the collegiate chapel of Wallingford castle, and subsequently was employed in various other choirs, and finally served as a retainer in the family of William Lord Paget. Afterward he became a farmer at Katwade, now Cattiwade, in Suffolk, where he wrote his work on husbandry entitled "A Hundreth Good Pointes of Husbandrie" (1557). This was the first didactic poem in the language, and in 1573 appeared in an enlarged form as "Fiue Hundreth Points of Good Husbandry vnited to as many of Good Huswiferie" (reprinted by Dr. Mavor in 1812). Fuller says Tusser was "successively a musician, schoolmaster, serving-man, husbandman, grazier, poet, more skilful in all than thriving in any vocation. He traded at large in oxen, sheep, dairies, grain of all kinds, to no profit. Whether he bought or sold he lost; and, when a renter, impoverished himself and never enriched his landlord."

TUTENAG. See Nickel, vol. xii. p. 349.

TUTHILL, Louisa Caroline (Huggins), an American authoress, born in New Haven, Conn., near the beginning of this century. She was married in 1817 to Mr. Cornelius Tuthill, a lawyer of distinction, who died in 1825. After his death she became a contributor to several magazines, and in 1827 published "James Somers the Pilgrim's Son," and in 1829 "Mary's Visit to B." In 1839 she first appeared under her own name as the editor of a volume of selections entitled "The Young Ladies' Reader," which was soon followed by a collection of tales and essays under the title of "The Young Ladies' Home." She afterward wrote three series of tales, which have had a very large circulation, and in 1846 published a novel entitled "My Wife;" in 1848, "The History of Architecture;" and in 1849 "The Nursery Book." She now (May, 1862) resides at Princeton, N. J.

TUTUILA. See Navigators' Islands.

TVER, a government of European Russia, bounded N. W. and N. by Novgorod, E. by Jaroslav and Vladimir, S. by Moscow and Smolensk, and W. by Pskov; area, 26,031 sq. m.; pop. in 1858, 1,491,427. The surface, though not mountainous, is considerably elevated in the S., and slopes toward the N., where it terminates in an extensive plain. It is watered by numerous rivers, the chief of which are the Volga, which becomes navigable in this government, the Düna, Tvertza, Sestra, Shôsha, and Mologa. The Volga is connected with the Neva by canal. There are several lakes, the most extensive of which covers 76 sq. m. The soil is of inferior quality, and the quantity of grain raised is scarcely sufficient for the consumption of the inhabitants. A large portion of the surface is covered with forests, consisting principally of birch, beech, and pine. The railway connecting Moscow with St. Petersburg passes through the province, and, together with its water communication with the Baltic, Black, and Caspian seas, gives it an important transit trade. There are few manufactures.—Tver, the capital, is situated at the junction of the rivers Tvertza and Tmaka with the Volga, 96 m. N. W. from Moscow; pop. about 24,000. It is divided into 4 parts by the rivers, has wide, regular streets, a large Gothic cathedral, and numerous churches ornamented with spires and gilded domes, an imperial and an episcopal palace, 2 monasteries, and several schools and charitable institutions. The rivers are crossed by 3 bridges of boats, and their banks are lined with quays which are favorite promenades. Linen, canvas, hardware, leather, and candles are manufactured; and an extensive trade is carried on in grain, hemp, fish, and iron. Tver was destroyed by fire in 1763, and rebuilt by Catharine II.

TWEED (anc. *Tueda*), a river of Scotland and England, which rises at Tweedshaws, at the S. extremity of Peeblesshire, 1,500 feet above sea level, among the Lowther hills, whence it runs about 20 m. N. E., and then turning E. passes the town of Peebles, crosses the counties of Selkirk and Roxburgh, separates Berwickshire from the English county of Northumberland, and for the last 4½ m. of its course lies wholly within English territory. It enters the North sea at the town of Berwick. Its length is 95 m., and it drains an area of 1,870 m., being more than any other Scottish river except the Tay. Its principal affluents from the N. are the Biggar, Gala, Leader, and Adder, and from the S. the Yarrow, Ettrick, Teviot, and Till. It is navigable only a few miles from its mouth, but is remarkable for its salmon fisheries and its picturesque scenery.

TWEEDDALE. See Peeblesshire.

TWESTEN, August Detlev Christian, a German Protestant theologian, born in Glückstadt, Holstein, April 11, 1789. Having studied theology and philosophy at the university of Kiel, he was appointed in 1812 professor at one of the gymnasia of Berlin, where his theological views were chiefly shaped by the influence of Schleiermacher. He became in 1814 extraordinary, and in 1819 ordinary professor of theology at the university of Kiel, and soon obtained, next to Claus Harms, the greatest influence in the Lutheran church of Holstein. In 1835 he accepted a call to the university of Berlin, as successor of Schleiermacher, and in 1851 was appointed a member of the newly created *Oberkirchenrath* (supreme ecclesiastical council) of the United Evangelical church of Prussia.

Twesten is regarded as one of the chief representatives of those who think that they can reconcile, in the main, the peculiar views of Schleiermacher with the old doctrines of the Lutheran church. His principal work is a volume of lectures on the doctrines of the Lutheran church (*Vorlesungen über die Dogmatik der evangelisch-lutherischen Kirche*, 2 vols., Hamburg, 1826–'37); and beside several other theological and philosophical works, he has published a handbook of logic (Kiel, 1834).

TWICKENHAM, a village and parish of Middlesex, England, on the Thames, opposite Richmond, with which it is connected by a handsome bridge, 11¼ m. W. S. W. from London; pop. in 1851, 6,254. It is celebrated as the residence of Pope. The poet's villa has been destroyed, but the grotto which he constructed and the monument erected by him to his mother are still standing; and his own monument is in the parish church, where he was buried. Walpole's seat, called Strawberry Hill, is about 1 m. distant. At Twickenham is also Orleans house, occupied by Louis Philippe while a refugee in England before his accession to the throne.

TWIGGS, a central co. of Georgia, bounded W. by the Ocmulgee river; area, 400 sq. m.; pop. in 1860, 8,320, of whom 5,318 were slaves. The surface is moderately hilly and the soil fertile. The productions in 1850 were 379,537 bushels of Indian corn, 76,323 of sweet potatoes, and 9,689 bales of cotton. There were 12 churches, and 210 pupils attending public schools. The Georgia central railroad crosses the N. border. Capital, Marion.

TWIGGS, David Emanuel, an American general, born in Georgia in 1790. He entered the United States army in 1812 as captain of the 8th infantry, and after the peace of 1815 was retained in the service as captain in the 7th infantry, with the brevet rank of major. In 1825 he was appointed major and in 1831 lieutenant-colonel in the 1st infantry, and in 1836 colonel of the 2d dragoons. He was attached to the invading army of Gen. Taylor in the spring of 1846, and for his services at the battles of Palo Alto and Resaca de la Palma, where he commanded the right wing, was in June of the same year commissioned a brigadier-general. He subsequently received the brevet rank of major-general and a sword from congress "for gallantry and good conduct in storming Monterey." He commanded a division under Gen. Scott in the campaign of 1847, and in 1848 was military governor of Vera Cruz. In Feb. 1861, being in command of the military department of Texas, he surrendered his troops and munitions of war to the authorities of the state, which had recently adopted an ordinance of secession; and upon his arrival soon after in New Orleans, he was received by the inhabitants with an enthusiastic ovation. On March 1 he was expelled from the U. S. army, and soon after received an important command in that of the "confederate states," which however he resigned toward the close of the year.—**Levi**, an American soldier, brother of the preceding, born in Richmond City, Ga., in 1793, killed at Chapultepec, Mexico, Sept. 13, 1847. He entered the U. S. service in 1813 as 2d lieutenant in the marine corps, and was the senior officer of marines on the frigate President during her last cruise under Decatur. After being variously employed on sea and land, he volunteered for the Mexican expedition under Gen. Scott, and fell mortally wounded while heading one of the storming parties in the assault upon Chapultepec.

TWILIGHT, the faint light which appears in the sky a little before sunrise, and again for some time after sunset, the amount and duration of the light varying materially in different latitudes and at different seasons of the year. The light is caused by the reflection of the sun's rays, when below the horizon, from the vapors and minute solid particles floating in it, and perhaps from the material atoms of the air itself. It is to this property of reflection possessed by the atmosphere that its illumination is due beyond the direct reach of the rays proceeding from the sun, as under the shadow of clouds and behind opaque objects upon the surface, where, unless the light were directed upon some principle of general diffusion, intense darkness would prevail. So also a sudden illumination would attend the rising of the sun and instantaneous darkness accompany his setting. As the sun sets to any point upon the surface of the earth, the atmosphere above this point all around the horizon is illuminated by direct rays, and the reflection from so broad an illuminated surface brings down to the earth a large amount of light; but as the dark shadow of the earth, in consequence of the continued sinking of the sun, rises higher and higher into the atmosphere at this locality, the reflected light steadily diminishes and finally disappears when no direct rays from the sun reach the higher regions of the atmosphere above the horizontal line extended toward the sunset. By observing the time after the setting of the sun to the disappearance of the reflected rays, data are afforded upon which an approximate estimate may be made of the height of the atmosphere; and it is on this method chiefly that this calculation is based. On the equator, when the sun is in the equinoctial, and apparently descending vertically, and occupying as much time below as above the horizon, the duration of the twilight is an hour and 12 minutes, or $\frac{1}{10}$ of the semi-circumference, equal to 18°; whence it is concluded that such must be its depression below the horizon at any place before the twilight can end; and it is reckoned from this that the height of the atmosphere is a little over 52 m. But this cannot be otherwise than a rude approximation, the calculation proceeding on the supposition of there being but one direct reflection, whereas the rays may be reflected again and again; and no account being made of the refraction the rays must experience in their direct passage through the dense stratum of air near the surface, and entering it again when turned back from the upper strata. By a different calculation, founded on observations of the progress of the edge of the dark shadow (known till it reaches the zenith as the anticrepuscular, and afterward as the crepuscular curve), made in the pure and transparent air at the summit of high mountains, the height of the atmosphere has been found by French astronomers (whose observations are recorded in the *Annuaire météorologique de France*, 1850) to be 71.46 m. This curve they found set when the sun was 17° below the horizon. The variable length of twilight at the same place in different seasons results from the varying declination of the sun and the consequent difference of time required to sink 17° or 18° below the horizon, as his course is vertical or more or less approaching it. Near the poles, where the sun attains at noon no great height above the horizon, it also keeps near it after disappearing each night; and if its depression does not exceed 18°, the twilight is continuous into the dawn of the morning. This is the case in some portion of the summer in all places for which the least polar distance of the sun is only 18° greater than the latitude; and as this distance diminishes and the sun is less and less depressed below the horizon, the twilight increases in brilliancy, and is finally lost during the period that the circuit of the sun is above the horizon.—A beautiful feature attending the twilight is the rich coloring of the clouds upon which the direct rays of the sun strike, and from which they are reflected in gorgeous tints, which slowly change their hues as the angle of reflection varies. This phenomenon is seen in greatest perfection in mountainous regions and over wide districts, where the air remains in a uniform condition unaffected by local causes. The presence of much moisture is also favorable for the display of the finest colors. Thus at sea, especially in the warm atmosphere of the Gulf stream, these exhibitions are of the finest character, as also over the waters of inland seas. Even when no clouds are formed, brilliantly colored bands are produced along the horizon, which change in a somewhat regular order with the continued rising or declining of the sun. These tints are due to the different powers of penetration possessed by the different rays of which white light is composed. In the same manner as the solar rays are decomposed and present different colors in passing through a piece of glass covered with smoke in layers of different thickness, these rays are also decomposed in penetrating the dense and humid lower strata of the atmosphere. A slight obstruction of this character extinguishes the blue rays, and causes those which pass through to appear of a yellowish red; next to this the yellow is arrested, and the light is orange; till with further obstruction the yellow entirely disappears, and the red rays alone reach the surface.

TWITE. See Linnet.

TYBEE, an island and sound at the mouth of the Savannah river, Georgia. The sound is more properly a bay of the Atlantic; it extends from Tybee island on the S. to Hilton Head island on the N., and communicates with Warsaw sound at the S. end of the former island by means of Lazaretto creek, navigable by light-draught vessels, and with Port Royal entrance on the N. by means of Cooper river, Wall's cut, and other navigable channels. The island is about 6 m. long and 3 m. broad. In the civil war of 1861-'2 it was occupied by the U. S. forces, under command of Brig. Gen. Sherman, Nov. 28, 1861, and batteries were subsequently erected on it and the adjacent islands for the reduction of Fort Pulaski at the mouth of the Savannah river, commanded by Col. Olmstead of the confederate army. The bombardment began on the morning of April 10, 1862, from 11 batteries between 1,500 and 3,000 yards from the fort, mounting 20 guns and 16 mortars; and the fort capitulated at 2 o'clock the next afternoon.

TYCHE. See Fortuna.

TYCHO BRAHE. See Brahe.

TYCHSEN, Olaus Gerhard, a German orientalist, born in Tondern, Schleswig, Dec. 14, 1734, died in Rostock, Dec. 30, 1815. After completing his studies at Göttingen in 1759, he was sent on a mission through Germany and Denmark by Callenberg for the conversion of Jews, but met with no success. In 1760 he became professor of oriental literature at Bützow, and when the university was removed to Rostock in 1789 was appointed chief librarian and keeper of the museum. His most important work is a journal called *Bützow'sche Nebenstunden* ("Leisure Hours at Bützow," 6 vols., 1766-'9). He wrote dissertations on the Arabic and Phœnician languages, and made many investigations in the history of Christian sects in Asia.

TYLER. I. A N. W. co. of Virginia, bordering on the Ohio river, and intersected by Middle Island creek; area, 390 sq. m.; pop. in 1860, 6,517, of whom 18 were slaves. The productions in 1850 were 130,014 bushels of Indian corn, 15,100 of wheat, 27,544 of oats, and 1,737 tons of hay. There were 4 grist mills, 9 saw mills, 3 tanneries, 7 churches, and 145 pupils attending public schools. Iron ore, bituminous coal, and excellent building stone and limestone are found in great abundance. Capital, Middlebourne. II. An E. co. of Texas, bounded N. and E. by the Neches river; area, 1,200 sq. m.; pop. in 1860, 4,525, of whom 1,148 were slaves. The surface is level and the soil fertile. The productions in 1850 were 35,099 bushels of Indian corn, 12,329 of sweet potatoes, 38 hogsheads of sugar, and 184 bales of cotton. Capital, Woodville.

TYLER, Bennet, D.D., an American clergyman, born in Middlebury, Conn., July 10, 1783, died in South Windsor, Conn., May 14, 1858. He was the son of a farmer, and was put to learn a trade, but entered Yale college, where he was graduated in 1804, and ordained as pastor of the Congregational church in South Britain, Conn., in 1808, where he remained 14 years. In 1822 he was elected president of Dartmouth college, and while in this office raised a fund of $10,000 to aid indigent students preparing for the ministry. In 1828 he resigned his presidency and became pastor of the 2d Congregational church in Portland, Me. During the controversy on the "new divinity" awakened by the writings of Dr. Taylor (see TAYLOR, NATHANIEL WILLIAM), he was recognized as the principal opponent of Dr. Taylor's views. His position was essentially that of the great divines of New England, Edwards, Bellamy, Smalley, and Dwight, on the subject of God's sovereignty, decrees, regeneration, man's natural ability and moral inability to obey God's commands, the nature of sin and holiness, and the nature and extent of the atonement. One result of this controversy was the formation of a pastoral union in Sept. 1833, by the Connecticut clergymen who held to Dr. Tyler's opinions, and the resolution to found a theological seminary at East Windsor, Conn., of which he was chosen president, and held that position till his death. His principal works are: "History of the New Haven Theology, in Letters to a Clergyman" (1837); "A Review of Day on the Will" (1837); "Memoir of Rev. Asahel Nettleton, D.D." (Hartford, 1844); "Nettleton's Remains" (1845); "A Treatise on the Sufferings of Christ" (New York, 1845); "A Treatise on New England Revivals" (1846); and two series of "Letters to Dr. Horace Bushnell on Christian Nurture" (1847–'8). He also published many sermons and controversial pamphlets. His memoir, by his son-in-law, the Rev. Nahum Gale, D.D., and a volume of lectures have been printed since his death.

TYLER, JOHN, 10th president of the United States, born in Charles City co., Va., March 29, 1790, died in Richmond, Jan. 17, 1862. His father, who bore the same name, was a distinguished patriot in the revolution, and was afterward successively speaker of the Virginia house of delegates, governor of the state, and judge of the federal court of admiralty, an office to which he was appointed by President Madison shortly before his death in Feb. 1813. John was his second son, and in his 12th year entered William and Mary college. At the age of 17 he was graduated, and on that occasion pronounced an address on "Female Education," which the college faculty declared to be the best commencement oration that had ever been delivered before them. After quitting college he studied law, and at the age of 19 was admitted to the bar, and almost immediately entered upon a large practice. Two years later he was elected a member of the legislature from Charles City co. by a nearly unanimous vote. He took his seat in Dec. 1811, and during the ensuing war with Great Britain steadily advocated the policy of Jefferson, Madison, and the other leaders of the democratic party. He was elected for 5 successive years, on one occasion receiving all the votes polled except 5. In 1816 he was elected to congress to fill a vacancy, and in the following year and again in 1819 he was reëlected by increased majorities. While in congress he voted with Mr. Clay for the resolutions of censure on Gen. Jackson's conduct during the Seminole war; and on the question of internal improvements by the general government, he voted against all propositions which countenanced the doctrine of power in the government to make such improvements. He was one of the committee appointed to investigate the concerns of the United States bank chartered in 1816, and supported a resolution inimical to the bank, and in his speech on this occasion took the ground that the creation of such an institution was unconstitutional. In fact, throughout his congressional career he maintained at all points the state rights or strict construction doctrines of the democratic party of Virginia. In 1819 he opposed in the debates on the tariff the protective policy, and on the Missouri question opposed all restrictions on slavery. Ill health compelled him soon after to resign his seat in congress before the expiration of his term, and retiring to Charles City co. he resumed the practice of his profession. In 1823 and the two following years he was a member of the legislature, and took a leading part in the debates of the house of delegates, in which he exerted much influence in behalf of a comprehensive system of internal improvements by the state. In Dec. 1825, he was chosen governor by the legislature by a large majority over Mr. Floyd, and at the next session was reëlected by a unanimous vote. He did not however long remain in this office, for on the approach of the expiration of the term of John Randolph as U. S. senator in March, 1827, a portion of the democratic members of the legislature, disgusted with the personal vagaries of that erratic statesman, coalesced with the whigs to elect Governor Tyler, though the political sentiments of the latter were identical with those of Mr. Randolph, and he was chosen on the first ballot by a majority of 5. In the presidential election of 1824 Mr. Tyler had supported for the presidency William H. Crawford of Georgia, who received the electoral vote of Virginia. The house of representatives having decided the election in favor of John Quincy Adams, the Crawford party of Virginia generally were satisfied with that result, and Mr. Tyler wrote a letter to Henry Clay approving of the choice of Mr. Adams in preference to Gen. Jackson. Soon afterward, in a public speech at Richmond, commenting on the first message of President Adams, he said that it had withered all his hopes. "I saw in it an almost total disregard of the federative principle—a more latitudinous construction of the constitution than has ever before been insisted on; lying not so much in the particular measures recommended

—which, though bad enough, had some excuse in precedent—as in the broad and general principles there laid down as the basis of governmental duty. From the moment of seeing that message all who have known any thing of me have known that I stood distinctly opposed to this administration; not from a factious spirit, not with a view to elevate a favorite, or to advance myself, but on the great principles which have regulated my past life." In the senate Mr. Tyler sided with the opposition to Mr. Adams, consisting of the combined followers of Jackson, Crawford, and Calhoun. He voted against the tariff bill of 1828, and against all projects of internal improvement, making a long speech against the Maysville road bill, and highly approving President Jackson's veto of that act. During the debate on Mr. Clay's tariff resolutions in 1831–'2, he made a speech which continued during three days, in which he opposed a tariff for direct protection, but advocated a tariff for revenue with incidental protection to home industry. At the same session he opposed the bill to continue the bank of the United States. In 1832 he avowed his sympathy with the nullification movement in South Carolina; and when President Jackson took decided ground against the nullifiers, Mr. Tyler withdrew his support from the administration, and made an animated speech against the force bill, which passed the senate with no vote but his in the negative, Mr. Calhoun and the other opponents of the bill having retired from the chamber. He however voted for Mr. Clay's compromise bill. His term in the senate expiring March 4, 1833, he was reëlected for the succeeding 6 years. In the session of 1833–'4 he supported Mr. Clay's resolutions of censure upon President Jackson for the removal of the deposits, and took an active part in the debate on that question, maintaining that the bank of the United States, though in his opinion unconstitutional, was yet an institution established by law and made by law the depository of the public money, and that therefore the removal of the deposits by the president was an unwarranted assumption of power on the part of the executive. His course at this time on this question was sustained by instructions from the legislature of Virginia; but in Feb. 1836, the legislature adopted resolutions instructing the senators from that state to vote for expunging from the journal of the senate the resolutions of censure upon the president. Mr. Tyler, who at the beginning of his political career had committed himself fully in favor of the right of instruction, could not conscientiously comply with the request of the legislature nor hold his seat in disregard of its mandate, and he accordingly resigned it and returned to his home, which about this time he had removed from Charles City co. to Williamsburg. His course in the senate had gained him a good deal of popularity among the state rights democrats who had arrayed themselves in opposition to Jackson and Van Buren, and who were to some extent coöperating with the whigs; and in the presidential contest of 1836 he was in Maryland run as candidate for vice-president on the same ticket with General Harrison, the whig candidate for president; while in other states where Judge White of Tennessee was the candidate for president, the supporters of that gentleman also used Mr. Tyler's name for the vice-presidency. The result was that he obtained the votes of Maryland, Georgia, South Carolina, and Tennessee. In 1838 he was elected a member of the legislature by the whigs of James City co., and during the subsequent session of that body he acted entirely with the whig party, under which name all branches of the opposition to Jackson and Van Buren had now become united. As a whig also he was chosen one of the delegates from Virginia to the whig national convention which met at Harrisburg, Dec. 4, 1839, to nominate candidates for the presidency and vice-presidency. He exerted all his influence in behalf of Henry Clay, and is said to have wept with sorrow when the convention rejected that statesman and nominated Gen. Harrison for president. As Harrison, however, was from the North, it was expedient to select the candidate for vice-president from the South; and to conciliate the friends of Mr. Clay, and also that portion of the opposition which in 1836 had supported Judge White, and who were still powerful in Tennessee, Georgia, North Carolina, Mississippi, and other southern states, the nomination to the second office was unanimously offered to Mr. Tyler and accepted. During the campaign his speeches, letters, and declarations of opinion were satisfactory to the whigs; and in the political songs which played so conspicuous a part in that memorable struggle, his name, in the popular refrain of "Tippecanoe and Tyler too," was as great a favorite in the mouths of the whigs as that of the victor of Tippecanoe himself. The result of the election, which took place in Nov. 1840, was the triumphant choice of the whig candidates by 234 electoral votes, Mr. Van Buren, the democratic candidate, receiving only 60 votes, which were those of the states of New Hampshire, Virginia, South Carolina, Illinois, Alabama, Missouri, and Arkansas. President Harrison died April 4, 1841, just one month after his inauguration, and for the first time in the history of the United States the administration devolved on the vice-president. Mr. Tyler was at Williamsburg when the news of Gen. Harrison's death was communicated to him, and on his arrival at Washington he was waited on by the members of the cabinet, whom he requested to remain in the places they held under President Harrison. Three days later he published an inaugural address, which was well received by the public, and in its indications of political principle was satisfactory to the whigs, who had naturally felt much anxiety as to the manner in which the peculiar policy of their party might be carried out by a president so recently a convert from the most intense school of Virginia democracy. Their satisfaction was increased by the promptness with which the new president began to remove from office the democrats who had been appointed by previous administrations, and to fill their places with whigs—a system of change which he pursued with vigor and perseverance through all branches of the public service. In his message to the congress which convened in extra session, May 31, 1841, the president discussed at considerable length the question of a national bank, which was at that period a leading feature of whig policy. He said: "In intimate connection with the question of revenue is that which makes provision for a suitable fiscal agent, capable of adding increased facilities in the collection and disbursement of the public revenues, rendering more secure their custody, and consulting a true economy in the great, multiplied, and delicate operations of the treasury department. Upon such an agent depends in an eminent degree the establishment of a currency of uniform value, which is of so great importance to all the essential interests of society, and on the wisdom to be manifested in its creation much depends. . . . . I shall be ready to concur with you in the adoption of such system as you may propose, reserving to myself the ultimate power of rejecting any measure which may, in my view of it, conflict with the constitution, or otherwise jeopard the prosperity of the country." These and similar expressions were interpreted as indicating that he would sanction any reasonable plan that congress might adopt for the creation of a national bank or "fiscal agent;" and he intimated to several members his desire that congress should request a plan for a bank from the secretary of the treasury, Mr. Ewing of Ohio, who in his report accompanying the president's message had spoken strongly in favor of such an institution. In compliance with this wish resolutions were introduced into both houses by the president's confidential friends, in obedience to which Mr. Ewing sent in a bill for the incorporation of the "Fiscal Bank of the United States," the essential features of which were framed in accordance with the president's suggestions and in deference to his peculiar views of the institution. It was referred in the senate to a committee of which Mr. Clay was chairman, who soon reported a bill that differed from Mr. Ewing's in no material particular except in relation to the establishment of branch banks, which in Mr. Ewing's plan were to be established only in states that had formally given their assent, while in Mr. Clay's no such assent was required. It was soon understood that the president disapproved of Mr. Clay's bill, on the ground that congress, though it had the power to create a bank, had no power to establish branches; and in order to appease his scruples on this point, a compromise was agreed to by the whig members, which it was asserted would be satisfactory to him. By this compromise it was arranged that branches might be established with the assent of a state; and if any state did not at the first session of its legislature after the passage of the bill express its dissent, its assent might be presumed by the directors of the bank, who were furthermore required to establish a branch in any state when directed to do so by congress. The bill thus amended was finally passed by congress on Aug. 6 and sent to the president. A report soon spread that he intended to veto it, and various delegations waited upon him to remonstrate against such an act. To one of these delegations, consisting of all the whig members of congress from Ohio, he replied with much emotion and even with tears that he felt the deepest interest in the matter, and desired only that certain constitutional objections should be removed from the bill, and finally asked them: "Why did you not send me Ewing's bill?" "Would you sign that?" said one of them. "I would," was Mr. Tyler's answer. Relying upon this promise, steps were immediately taken by the whig leaders to pass Mr. Ewing's bill; but before that could be done the president declared that he must recall his pledge to sign Mr. Ewing's bill, which he had not then read, but which now on examination he found he could not conscientiously approve. On Aug. 16 he sent the senate bill back to congress with a veto message, in which he argued that the bill was unconstitutional because it attempted to create a bank to operate *per se* over the Union; because it was a bank of discount; because it was not exclusively confined to the power of dealing in exchanges; and lastly, because the assent of the states in the establishment of branches was not sufficiently secured. This veto created great excitement and anger among the whigs throughout the country, who suspected that it was prompted by democratic influence, and that it foreboded the betrayal and desertion by Mr. Tyler of the party which had elevated him into power. The whig leaders in congress, however, made yet another effort to conciliate the president and secure his assent to their favorite measure. He himself said to a member from Ohio that his message contained a plan of a bank which had been long a favorite idea with him. Mr. Berrien of the senate and Mr. Sargeant of the house were accordingly deputed to confer with him and ascertain precisely what kind of a bill he would approve. In an interview held on Aug. 19, he told them he was in favor of a fiscal agent divested of the discounting power, and limited to dealing in bills of exchange other than those drawn by a citizen of one state upon another citizen of the same state. A bill was accordingly prepared embracing these features, was privately submitted to the president and approved by him and his cabinet, and finally without any alteration passed by the house, Aug. 23, and by the senate two weeks later. While the bill was yet pending in congress a private letter written by John M. Botts, a distinguished whig member of congress from Virginia, to a friend at Richmond, found its way surreptitiously into the newspapers, and is supposed to have had a strong effect upon the action of the president, of whom it said: "Captain Tyler is making a desperate effort to set himself up with the locofocos, but he'll be headed yet, and I regret to say it will end badly for him. He will be an object of execration with both parties; with the one for vetoing our bill, which was bad enough—with the other for signing a worse one; but he is hardly entitled to sympathy. . . . . You'll get a bank bill, but one that will serve only to fasten him, and to which no stock will be subscribed; and when he finds out that he is not wiser in banking than all the rest of the world, we may get a better." From this letter the president inferred that the design of the whigs in proposing and passing the new bank bill was merely to "head" him and to "fasten" him by forcing him to subscribe to a measure inconsistent with his previous professions of principle, and he accordingly sent it back to congress with a veto. This act caused great indignation among the whigs, who regarded it as a palpable betrayal of their confidence; while on the other hand it was warmly applauded by their democratic opponents, who held numerous meetings throughout the country to approve the president's course. Two days after the promulgation of the veto, the cabinet, with the exception of Mr. Webster, the secretary of state, sent their resignations to the president; and Mr. Ewing, secretary of the treasury, Mr. Bell, secretary of war, Mr. Badger, secretary of the navy, and Mr. Crittenden, attorney-general, published statements of their reasons for this step, reflecting severely on the conduct of Mr. Tyler. The president promptly filled their places by appointing Walter Forward, of Pennsylvania, secretary of the treasury; John C. Spencer, of New York, secretary of war; Abel P. Upshur, of Virginia, secretary of the navy; Charles A. Wickliffe, of Kentucky, postmaster-general; and Hugh S. Legaré, of South Carolina, attorney-general—all of them whigs, or at least opponents of the democratic party. Before the adjournment of congress, Sept. 13, the whig members subscribed a manifesto and ordered it to be published, in which they proclaimed that all political relations between them and John Tyler were at an end; that from that day "those who brought the president into power could no longer, in any manner or degree, be justly held responsible or blamed for the administration of the executive branch of the government." The course taken by Mr. Webster in remaining in the cabinet while his colleagues withdrew was severely condemned by a portion of the whigs, but was justified by the greater portion of the people on the ground that the critical condition of our relations with Great Britain on the subject of the north-eastern boundary made it highly desirable that the negotiations on that subject, in which he was at the time engaged with the British ministry, should be continued and concluded by him. In the following winter Lord Ashburton was sent by Great Britain as a special minister to the United States on this subject, and between him and Mr. Webster a satisfactory treaty was arranged, which was ratified by the senate, Aug. 20, 1842. In the following May Mr. Webster resigned, and was succeeded by Mr. Legaré, who died soon after during a visit made by the president and cabinet to Boston to attend the celebration of the completion of the Bunker Hill monument. In July President Tyler reorganized his cabinet as follows: Mr. Upshur, secretary of state; Mr. Spencer, secretary of the treasury; Mr. Wickliffe, postmaster-general; James M. Porter, of Pennsylvania, secretary of war; David Henshaw, of Massachusetts, secretary of the navy; John Nelson, of Maryland, attorney-general. Messrs. Porter, Henshaw, and Nelson were democrats, and the first two were rejected by the senate when their nominations came before it at its next session. In their places the president appointed William Wilkins, of Pennsylvania, secretary of war, and Thomas W. Gilmer, of Virginia, of the navy, who were both confirmed, Feb. 15, 1844. On Feb. 28, however, Mr. Gilmer and Mr. Upshur, while inspecting the U. S. war steamer Princeton, were killed by the bursting of one of her guns, and Mr. Calhoun, of South Carolina, was appointed secretary of state, and John Y. Mason, of Virginia, secretary of the navy. Under the able management of Mr. Calhoun a treaty of annexation was concluded between the United States and Texas, April 12, 1844, which was rejected by the senate. The scheme of annexation, however, was vigorously prosecuted by the president, and at the very close of his administration brought to a successful issue by the passage of joint resolutions by congress, March 1, 1845. The other most important measures of his administration were the act establishing a uniform system of bankruptcy, passed in Aug. 1841, and the tariff law of 1842, by which ample provision was made for the public revenue and protection afforded to American manufactures. The result of the peculiar policy of the president was that toward the close of his term it became evident that he had lost the confidence of the whigs without having secured that of the democrats. There was but one whig in the senate on whose support he could rely, and but 5 or 6 in the house of representatives. He had been persuaded, however, that the mass of the people were attached to him, and that he could be reëlected without the support of either of the existing parties; and in May, 1844, a convention composed chiefly of officeholders assembled at Baltimore and tendered him a nomination for the presidency, which he accepted; but in August, perceiving that he had really no popular support, he withdrew from the canvass. The election in the subsequent November resulted in the choice of James K. Polk as president and of George M. Dallas as vice-president, and in the return of the democratic party to power. Mr. Tyler after his retirement from the presidency, March 4, 1845, remained in private life till in 1861 he appeared as a member of the peace convention, composed of delegates from the "border states," which met at Washington to endeavor to arrange terms of compromise between the seceded states of the South and the federal government. Of this convention he was elected president, but nothing resulted from its deliberations. He subsequently renounced his allegiance to the United States, and gave his support to the confederate cause. At the time of his death he was a member of the confederate congress, then in session at Richmond. Mr. Tyler was tall and thin in person, with very prominent features and courtly and pleasing address. He was married in 1818 to Letitia, daughter of Robert Christian, of New Kent co., Va., who died at Washington in 1842, leaving 3 sons and 3 daughters. On June 26, 1844, he was married again to Julia, daughter of David Gardiner, of New York, who survives him.

TYLER, Royall, an American author and judge, born in Boston, Mass., in 1756, died in Brattleborough, Vt., Aug. 16, 1826. He was graduated at Harvard college in 1776, served for some time on the staff of Gen. Lincoln, and subsequently devoted himself to the practice of the law, and also to some extent to literary pursuits. During a visit to New York in 1786 he produced at the John street theatre "The Contrast," the first American play acted on a regular stage by an established company, and the first also in which an attempt was made to portray the conventional Yankee dialect and character. It had great success, and was followed in the same year by "May Day, or New York in an Uproar." In 1790 Mr. Tyler removed to Vermont, where he became eminent in his profession, beside gaining considerable reputation as a contributor of humorous miscellanies in prose and verse to the periodical press. In 1797 he produced another successful comedy, "The Georgia Spec, or Land in the Moon," and also a novel in 2 volumes entitled "The Algerine Captive." He was for a number of years an associate justice and chief justice of the supreme court of Vermont, and published 2 volumes of reports.

TYLER, Samuel, an American author and philosopher, born in Prince George's co., Md., Oct. 22, 1809. He was admitted in 1831 to the Maryland bar, and established himself in Frederic City, where he has since chiefly practised his profession. In 1836 he became a contributor to the "Princeton Review," in which he has published some of his most profound productions. In 1844 he published a "Discourse of the Baconian Philosophy," which gained him the friendship and uninterrupted correspondence of Sir William Hamilton, the Scottish philosopher, the article upon whom in this cyclopædia is from his pen. His remaining works are: "Burns as a Poet and as a Man" (New York, 1848), and "The Progress of Philosophy in the Past and in the Future" (12mo., 1859). He is also the author of a report on the subject of law reform in the state of Maryland.

TYLER, William Seymour, D.D., an American clergyman and linguist, born at Harford, Susquehanna co., Penn., Sept. 2, 1810. He was graduated at Amherst college in 1830, and in 1831 became a classical teacher in Amherst academy. He afterward studied at Andover theological seminary, and was licensed to preach by the 3d presbytery of New York city in 1836, but, being elected professor of the Latin and Greek languages and literature in Amherst college about the same time, was not ordained till 22 years later. In 1847 the professorship of ancient languages was divided, Prof. Tyler retaining that of Greek. In 1855 he visited Europe and the East. In 1847 he published "The Germania and Agricola of Tacitus," followed by "The Histories of Tacitus" (1848) and "Plato's Apology and Crito" (1859). His other works are: "Prize Essay on Prayer for Colleges" (1854), and a "Life of Dr. Henry Lobdell, Missionary at Mosul" (Boston, 1859). He has also contributed numerous articles to the "Biblical Repository," "Bibliotheca Sacra," "American Theological Review," and other periodicals, among which is a series still in progress in relation to the opinions and views of the poets and philosophers of ancient Greece on the character of the Supreme Being, on sin and its expiation, and other points of natural theology; the titles of some of these are: "Theology of Æschylus," "Theology of Sophocles," "Socrates as a Teacher," "The Homeric Doctrine of the Gods," "The Homeric Doctrine of Sin and its Expiation," &c.

TYMPANUM. See Ear.

TYNDALE, William, an English reformer and translator of the Bible, born at North Nibley, Gloucestershire, probably in 1484, executed at Vilvoorden, in Brabant, Oct. 6, 1536. He was educated first at Oxford (where for a while he was tutor), and afterward at Cambridge, took orders as a priest, and was received as instructor in the house of Sir John Walch near Bristol. The reformation from the beginning had enlisted his sympathy, and while he was a tutor in this family he translated the *Enchiridion Militis*, or "Soldier's Manual," of Erasmus into English. His boldness of speech soon brought him into suspicion, and for a larger field and more security he went to London, where he began his translation of the New Testament. He was soon compelled to flee again, and having received the promise of an annuity of £10 from Alderman Munmouth, with the condition that he should pray for the souls of the alderman's parents, he went to Hamburg, where for a year he gave himself to his work; thence to Cologne, where the first 10 sheets of his translation were put to press; and thence to Worms, where in 1525 two editions were published anonymously. They had speedy and wide circulation. The edict of the bishop of London, forbidding under heavy penalties their use or their possession, only increased the demand. Tyndale was lampooned and vilified by Sir Thomas More in 7 books of elaborate abuse, in which he was pronounced a blasphemous beast, only fit for burning; and plots were laid to arrest him, which he foiled by removing in 1528 to Marburg, where he published his work on the "Obedience of a Christian Man." In 1529 a 5th edition of the New Testament was printed; and in 1530 appeared Tyndale's translation of the Pentateuch. The deceitful invitations to return to England he was too wise to accept; but his friend and assistant John Frith was less wary, and suffered at the stake in 1533. A new edition of the New Testament, revised and corrected, was issued at Antwerp in 1534, in which Tyndale avowed his responsibility for the work. But an emissary of Henry VIII., acting in concert with the clergy and magistrates of Brussels, procured his arrest in the house of Pointz, where he had found refuge, and carried him to Vilvoorden, where there was a strong prison. His sentence was pressed by the English king and by the neighboring university of Louvain; and authority having been given to proceed against heretics in this kind by a decree of the emperor made in the assembly at Augsburg in 1530, Tyndale was strangled and burned at the stake. The spot is still shown near the site of the new penitentiary. It is recorded that he suffered bravely, and that his last words were a prayer for the king of England. The works of Tyndale and Frith, which were collected and published after the reformation was established, were issued in London in 3 vols. 8vo. in 1831, and by the "Parker Society" (3 vols., 1848–'50). The translation of the New Testament was the principal model and basis of King James's version, and its diction is but little more obsolete than the diction of that version. A beautiful edition of it was published in London in 1836, edited by George Offor (reprinted, Andover, Mass., 1837).

TYNE, a river of Northumberland, England, formed by the junction of the North and South Tyne, the former of which rises in the Cheviot hills, on the border between England and Scotland, and the latter in the N. W. part of Cumberlandshire. These two streams unite near Hexham in the S. part of Northumberland, and the Tyne thence has a course of 35 m., generally E., to the North sea. For the last 18 m. it forms the boundary between Northumberland and Durham. It is navigable by vessels of 300 or 400 tons as far as Newcastle-upon-Tyne. Its principal affluent is the Derwent. At its mouth on the N. is the town of Tynemouth, which with North Shields adjacent forms a parliamentary borough (pop. in 1861, 33,991). The place is fortified, and the British government has recently strengthened the defences, and is now (1862) engaged in constructing here a vast breakwater with the design of forming a harbor of refuge. The Tyne is the great mart of the sea-borne coal trade, and once possessed valuable salmon fisheries.

TYNG, Stephen Higginson, D.D., an American clergyman, born in Newburyport, Mass., March 1, 1800. He was graduated at Harvard college at the age of 17, was engaged for two years in mercantile pursuits, began the study of theology under Bishop Griswold in 1819, and was ordained deacon at Bristol, R. I., March 4, 1821. Having labored for two years at Georgetown, D. C., and for 6 years in Queen Anne's parish, Prince George's co., Md., he removed to Philadelphia in May, 1829, to take charge of St. Paul's church in that city. He received the degree of D.D. from Jefferson college in 1832, and from Harvard in 1851. In May, 1833, he became rector of the church of the Epiphany, Philadelphia; and on the death of the Rev. Dr. Milnor in 1845, he became his successor in St. George's church, New York, of which he is still rector (1862). He has published "Sermons preached in the Church of the Epiphany, Philadelphia" (1839); "Lectures on the Law and the Gospel" (1848); "Israel of God;" "Recollections of England;" "Family Commentary on the Four Gospels" (1849); "Christ is All" (1849); "Bible Companion;" "Christian Titles;" "The Rich Kinsman: the History of Ruth the Moabitess" (1855); "The Captive Orphan: Esther the Queen of Persia;" "The Child of Prayer," a memorial of his son, the Rev. Dudley A. Tyng; "Forty Years' Experience in Sunday Schools," &c.

TYPE (Gr. τυποω, to stamp), a piece of metal or of wood, having the form of a letter or other character in relief upon one end, used in printing. The various forms of type have been described in the article Printing, vol. xiii. p. 587; that article also contains the history of their invention, the methods of their use, &c. Types are usually composed of an alloy known as type metal, which formerly consisted of 75 parts of lead and 25 of antimony. A harder alloy was afterward substituted for this, especially for the smaller letters, consisting of 50 parts of lead, 25 of tin, and 25 of antimony. Other compositions have also been used, in one of which, known as Didot's metal, 1 part of copper is united with 3 each of lead, tin, and antimony. While such mixtures produce a desirable amount of hardness, they are apt to be brittle, and thus fail to retain the sharp lines of the letter upon which their value depends. The composition of type metal varies, however, with different founders, each of whom adopts the alloy which he considers the most durable and best suited to the peculiar style and size of the type cast.—The principal instruments used in the casting of types are the punch, matrix, and mould. The punch is a well tempered piece of steel, on one end of which is carefully cut in bold relief a character which is the exact counterpart of the finished type. The cutting of the punches is a very tedious process, requiring great skill on the part of the workman; and the number of those who are adepts in the art is comparatively few. As a separate punch is necessary for each letter or character of every font or size of type, their preparation is the most expensive preliminary connected with type founding. Upon the punch being finished and hardened, the end with the character engraved upon it is struck with great care into a piece of copper, which is then called the matrix, and which forms a mould for the face of the type; and the sides and end of the matrix are accurately squared, in order that when fitted to the mould it shall be perfectly true and properly connect with that portion of the latter which is to form the shank or body of the type. Matrices are also formed by the deposition of copper on type by the electrotype process, for the purpose of copying or reproducing a particular size or style without the expense of cutting new punches. All the characters of a font may thus be reproduced at once by passing the faces through holes in thin strips of brass and fastening these together by clamps, or connecting the bodies in a solid mass by means of melted wax. The mould in which the type is cast by hand is an instrument in two parts, each made of steel, and backed with wood for facility in handling when the metal parts become heated. The two parts of the mould are so made that they can be fitted quickly and accurately together. The necessary quantity of metal is poured into a square opening in the top, beneath which is the cavity that forms the mould for the body of the type, with the matrix at the bottom to form the face or character. The caster then gives the mould an adroit jerk upward, thereby expelling the air and forcing the fluid metal into all the recesses and cavities of the matrix. When the metal becomes sufficiently hard, the caster separates the two parts of the mould and removes the type by a small hook. By this process an expert workman can cast from 400 to 500 types per hour. In the early part of the present century experiments began to be tried with a view of producing a machine which should cast types faster than could be done by the hand process; and about the year 1825 Mr. Elihu White of New York succeeded in inventing the first machine for this purpose. This was considerably modified and improved upon at various times by Mr. David Bruce, until in 1850 the most perfect machine at present in use was produced, the patent right of which is owned by the firm of James Conner's sons, type founders, of New York. This has at its back a small pot of metal, which is kept in a fluid state by a coal fire beneath; at the bottom of the metal pot is a small hole or well in which a piston is inserted. The front part of the machine consists of an ingenious modification of the hand mould, in which the matrix is fitted, having a spring pressing upon it to keep it in its place. Upon motion being given to the machine, by a crank and fly-wheel at the side, the piston in the metal pot is raised sufficiently to allow the necessary quantity of metal to pass into the well; the piston, descending, forces the metal forward through an appropriate channel into the mould; the pressure of the spring upon the matrix is relieved, allowing it to fall back sufficiently to release the face of the type; the upper part of the mould rises, carrying the type with it, which, striking against a projection for the purpose, drops into a trough and slides into a box in front of the machine. At the next revolution of the wheel, the pressure of the spring being restored, the matrix is returned to its place, and the mould closes ready for the reception of the metal to form another type. Each turn of the crank produces a type, and the speed of casting is limited only by the time necessary to be allowed for the cooling of the metal in the mould; this is at the rate of one per minute of the largest size to 150 per minute of the smallest. Each machine is adapted to cast type of a certain series of sizes, the smallest being equal to one half of "nonpareil," and the largest equal to 7 lines of "pica." These machines are now very generally used both in America and Europe, and in some founderies are run by steam power; they have occasioned a great reduction in the cost of type. The old hand mould is now seldom used except for casting large ornamental and fancy type, or those which are "kerned" or have projections extending over the body of the type. Each type as cast has a small piece of metal attached to the bottom of its body, being the surplus metal poured into the mould; this is broken off by a boy at the rate of 2,000 to 5,000 an hour. The flat sides of the type are then rubbed upon a piece of gritstone to render them free from roughness, generally by young women. They are then set up in long lines, and secured together while the dresser scrapes or polishes the flat surfaces on the top and bottom of the body, cuts a groove along their lower ends by a small plane, and carefully examines the face of the types to remove any defective letters. All the types of one font have one or more corresponding nicks or grooves across the front edge near the bottom, which generally vary in position or number with each font, and are formed by the insertion of wires in the mould, or cut by the dresser when the types are secured in lines for his inspection. Upon leaving the dresser the types are arranged in lines of convenient length and the requisite number of each character for a font selected, when they are ready for the use of the printer.—The rapid wear of fonts of type, and of stereotype plates made of the same metal, has long rendered it desirable to make them entirely of a better material, or to devise some method of adding to the durability of that already in use. This object was accomplished by the invention of what is known as copper-facing, made by Dr. L. V. Newton of New York, and patented in Aug. 1850. This consists in depositing over the character only of the type, or the face of the stereotype plates, a coating of copper by the galvanic process. (See ELECTRO-METALLURGY.) This invention was first applied in practice to the New York "Courier and Enquirer," "Herald," and "Tribune;" and in 1851 it was brought into use in England. The same year it was also introduced into France and copper-faced types were used in 1852 for the *Revue des deux mondes* and "Galignani's Messenger." The types are generally regarded as possessing more than twice the durability of those not thus protected. About two years before this invention, M. Petit had produced in France types made entirely of copper, the density of which was considerably increased by the pressure to which the metal was subjected in the steel dies and matrices in which the types were shaped as they were cut from the long strips of prepared metal.—Wood is used for the large types of handbills and "posters," the sizes of which range from 4 lines up to 150 lines "pica." The wood selected is prepared in the same manner as that employed in wood engraving, maple being most used. (See ENGRAVING, vol. vii. p. 208.) The outline of the letter or character is first carefully cut upon the face of the block with a graver. It is then placed upon a table under a drill or cutter which revolves vertically with great rapidity. This, by an arrangement of wheels and rollers, can be moved by a lever in any direction over the face of the block, and it quickly cuts away the superfluous portions of wood, leaving the character standing in bold relief. The block is then passed to the engraver, who gives it the finishing touches with the graver.—Types were first manufactured in the United States by Christopher Sower at Germantown, Penn. He cast several fonts for himself and others in both German and English characters, and the anvil on which he forged the matrices is still to be seen at Germantown. Sower was a publisher of German books, and it was for the purpose of supplying the Scriptures to his countrymen at a cheap rate that he undertook this manufacture and that of printing ink. The monopoly enjoyed by the universities in Great Britain of printing English Bibles was thus the cause of the first Bibles printed in this country being in German. Christopher Sower, jr., continued the business, and the type manufacture descended from him to Messrs. Binney and Ronaldson of Philadelphia, who about the beginning of this century cast all the types made in the United States, and introduced a modification of the type mould which was the first real improvement in type founding since its early establishment. It was introduced into Europe by the name of the "American mould." Among the other type founderies of the last century, none of which however continued permanently in operation, was that of a Mr. Michelson from Scotland, who made very good types in Boston in 1768. Abel Buell, of Killingworth, Conn., an ingenious gold and silversmith, received aid during the war from the colony in establishing a type foundery at New Haven, and for this purpose made use of the Sandemanian meeting house in Gregson street. Dr. Franklin brought with him from Europe in 1775 the materials for a complete type foundery, which he fitted up in Philadelphia, especially designing it for his grandson Mr. Bache. Mr. John Baine, a type founder of Edinburgh, removed to Philadelphia not long after the war, and established a foundery in which he cast the types for a portion of the edition of the "Encyclopædia Britannica" which was republished by Thomas Dobson, the first volume in 1790. Before the close of the century David Bruce from Edinburgh established the same business in New York, and in 1818 the firm of David and George Bruce commenced the first stereotype foundery in the United States. George Bruce was the inventor of the type called secretary or ronde, and several valuable improvements in the type and stereotype manufacture were introduced by this family.

TYPE SETTING MACHINE. See PRINTING, vol. xiii. p. 589.

TYPHOID FEVER, an acute, febrile, contagious disease, occurring but once in the same individual, and having as an anatomical characteristic a peculiar alteration of Peyer's glands. On the subject of essential fevers, as they are termed, inextricable confusion exists among the older writers. Fevers in all probability essentially the same are described under different names and as distinct diseases, while on the other hand distinct diseases are confounded together. This confusion has remained down to our own time, vitiating the histories and descriptions of writers upon the subject. The minute and truthful account of Louis, connecting the history and symptoms of typhoid fever with its characteristic anatomical lesion, first led the way to the distinctions which have since obtained, and now ephemeral and relapsing, typhus and typhoid fevers are almost universally admitted as distinct diseases. The causes of typhoid fever are still a matter of doubt. That it is infectious is beyond dispute; patients brought into a hospital where typhoid fever prevails are seized with it, and it spreads in private houses where there is crowding or deficient ventilation; but it occurs in other cases where contagion would seem out of the question. In England, many have connected it with defective and insufficient sewerage; while others, locating the infectious principle in the discharges from the bowels, interpret by the light of their own theory the facts seen by the former class of observers. It is remarkable that the disease has for many years been endemic in New England, while it would seem to be replaced by malarious fevers in the other parts of the Union. It is confined to no age, but is most common in young adults; according to Louis, those between 18 and 30 years of age are most exposed to its attacks; it is rare in infancy, but gradually increases in frequency with advance in age; after 50 years of age its occurrence is entirely exceptional. Sex and season would seem to exercise but little influence, but, like other contagious diseases, it sometimes prevails epidemically. A strange theory has been started in France connecting the prevalence of typhoid fever with the general diffusion of vaccination. Though supported by an appeal to statistics, the notion has no real foundation, while it is contradicted by the fact that typhoid fever occurs equally and with the same severity among the vaccinated and the unvaccinated.—The disease may be preceded by diarrhœa, pains in the limbs, and a sense of weariness and weakness. It commences with chills alternated with heat, with pain in the head, back, and limbs, and with sudden prostration of strength; there are giddiness and ringing in the ears, loss of appetite, sleeplessness or disturbed sleep, and increased frequency of pulse. Diarrhœa is often present from the first; sometimes it supervenes during the first 2 or 3 days; in rare instances (3 cases in 101, Barth) it is wholly absent or the bowels are constipated. The diarrhœa varies in intensity; sometimes there are but 2 or 3 stools in the 24 hours, more commonly 6 or 8, occasionally 15 or 20. The stools are thin and offensive, vary in color, and occasionally contain blood. Colicky pains occur in the bowels, and these, particularly in the right iliac fossa, are somewhat sensitive to pressure; strong pressure in the same region commonly produces a gurgling sound. As the disease advances, *meteorismus* occurs, the bowels becoming distended with gas and tympanitic. The tongue is at first coated, red at the edge, and tremulous; afterward it becomes more or less dry; in bad cases it may become hard, black, covered with sores, and cracked; sometimes in very bad cases it is thickened, swollen, and hard. Headache, as was before mentioned, occurs in the commencement; the pain is dull and heavy, and is commonly seated in the forehead; as delirium supervenes, it disappears. In exceptional cases it is excessively severe, and continues throughout the course of the disease. The prostration of the patient, strongly marked at the commencement, increases as the case advances, and is accompanied by giddiness and confusion of thought. The patient has a dull, confused look; when spoken to, he seems slow of comprehension, and answers hesitatingly. Stupor occurs in many cases, sometimes earlier, sometimes later in the disease; the patient seems most of the time sunk in a heavy slumber, from which he is for the most part easily roused; this slumber brings with it no refreshment, and when questioned the patient declares that he has not slept at all. In cases of any severity, more or less delirium constantly occurs, coming on chiefly at night; often when roused the patient will answer a few questions rationally, and then lapse again into delirium; it is commonly mild, but sometimes furious, making it necessary to use force to restrain the patient. Attendant upon the delirium occurs irregular and spasmodic contraction of the muscles, *subsultus*, *tendinum*, &c. The countenance when the disease is fully developed is commonly dusky, the face somewhat flushed, the cutaneous circulation slow. Very generally in the course of the disease a peculiar eruption makes its appearance, consisting of small, round, rose-colored spots (*taches roses lenticulaires*), slightly elevated above the surface, and varying from ¼ to 1/12 of an inch in diameter. They are commonly observed on the belly or the lower part of the chest, sometimes on the upper part of the thighs, rarely over the whole surface. The eruption ordinarily commences about the 7th day, sometimes later. The spots do not all appear at the same time, but a few, perhaps only 2 or 3, will show themselves; after 3 or 4 days these fade, being in the mean time replaced by others. Sudamina, minute colorless vesicles closely crowded together, show themselves in a majority of cases; their principal seats are the neck and the epigastrium. Petechiæ occasionally occur, but they are exceptional phenomena. The fever is almost invariably attended with cough, sometimes trifling, occasionally severe and harassing. Auscultation commonly discovers dry ronchi throughout every part of the chest; occasionally large crepitation is present; percussion is normal unless there is some complication. The pulse in bad cases is small, weak, and frequent; occasionally it is preternaturally slow.—The duration of typhoid fever varies from 15 days to 7 weeks or longer; when the disease is protracted, sloughs are apt to form over the parts most exposed to pressure, particularly the sacrum and hips. When the case is fatal, death most frequently occurs between the 15th and 30th days. A very frequent and feeble pulse, great oppression of breathing, low delirium alternating with stupor or coma, great meteorismus, frequent or involuntary stools, and retention of urine are all very unfavorable symptoms. Occasionally considerable quantities of blood are passed by stool, and in rare instances perforation of the bowels takes place and the patient dies of peritonitis. The characteristic lesion found after death from typhoid fever is the affection of Peyer's glands; these are swollen by a deposit beneath the mucous membrane of a peculiar, homogeneous, amorphous, friable matter (typhoid deposit), which, softening and becoming discharged, leaves an oblong ulceration, the greatest diameter of which corresponds with the long diameter of the intestines. The mesenteric glands corresponding to the portion of the intestine affected with the ulceration are swollen and altered. The spleen is found swollen and softened.—As in other specific diseases, the treatment of uncomplicated typhoid fever consists mainly in placing the patient under favorable hygienic circumstances, in the early administration of suitable nourishment, and, in severer cases and the more advanced stages of the disease, in the administration of tonics and stimuli, according to the requirements of the system. (See Typhus.)

TYPHON, in Greek mythology, a monster of the primitive world. Hesiod makes him the son of Typhœus, but the two are confounded in the later writers. The common account made him the son of Tartarus and Gæa, and destined to revenge the defeat of the Titans by the Olympian gods. Another form of the legend represented him as having been born to Juno by her own unaided generative forces, on account of her anger at Jupiter for having given birth to Minerva. According to Pindar, Typhon was larger and stronger than any thing to which the earth had given birth; his head reached to the stars, his eyes darted fire, his hands extended from the east to the west, terrible serpents were twined about the middle of his body, and 100 snakes took the place of fingers on his hands. Between him and the gods there was a dreadful war, and in one account he stormed Olympus and drove the immortals to Egypt. Jupiter finally killed him with a flash of lightning, and buried him under Mt. Ætna. The legend of Typhon is simply symbolical of earthquakes and violent winds, and the devastation caused by them.

TYPHON, or Seth, an Egyptian deity. See Demon, vol. vi. p. 368.

TYPHOON. See Hurricane.

TYPHUS, a continued contagious fever, attended with great prostration of the vital powers, and characterized by the occurrence of a mulberry-colored rash, somewhat resembling that of measles. Until within a short period, under the names of continued fever, nervous, putrid, ataxic, adynamic, gastro-enteric fever, &c., typhus and typhoid fever were confounded together. Dr. Gerhard of Philadelphia, so recently as 1837, was the first perhaps to point out the distinct character of the two diseases; the late Dr. Elisha Bartlett, in his work on the fevers of the United States (Philadelphia, 1847), advocated similar views; finally, Dr. Jenner of London, in an elaborate work "On the Identity or Non-Identity of the Specific Causes of Typhus, Typhoid, and Relapsing Fevers" (London, 1850), appears to have placed the question beyond the limits of controversy. The two diseases resemble each other very strikingly in their commencement, their course, and the great fatality that attends them. They both begin commonly with chills, sudden prostration of strength, pain in the back and limbs, and increased frequency of pulse; but the diarrhœa so constantly present in typhoid fever is as commonly replaced by constipation in typhus; the pains in the bowels, the tenderness, the tendency to tympanitis, and the gurgling in the iliac region on pressure of typhoid fever, are absent in typhus; while the head symptoms—the pain, the confusion of thought, the noise in the ears, the delirium—are more aggravated. The eruption still more distinctly characterizes the two diseases. In typhoid fever it is confined commonly to the abdomen and lower part of the thorax, and consists of small, distinct, rose-colored circular spots, readily disappearing under pressure. In typhus the eruption is dark, mulberry-colored, aggregated in patches, not completely disappearing under pressure, diffused over the surface, and commonly largely intermingled with petechiæ. In the course of the disease the body often exhales a peculiar and offensive smell. The mortality of typhus is greater than that of typhoid fever, but different epidemics vary greatly in fatality; in the typhus that raged so widely in the United States in 1848–'9, resulting from the extensive immigration from Ireland caused by the famine there, patients from some ships communicated an intenser form of the disease than those from others. The average duration of typhus is however much shorter than of typhoid fever. Sometimes patients die as early as the 3d or 4th day; and when convalescence takes place, it is rarely protracted beyond the 28th or 30th day.—On post-mortem examination, the alteration of Peyer's glands, the characteristic of typhoid fever, is not found, nor does our present knowledge of pathological anatomy enable us to point to any condition which is essential. A change in the character of the blood itself, and some little softening and congestion of various viscera, are all that is constantly found.—The essential cause of typhus is contagion, and without the presence of the fever itself the other causes would remain inoperative. Crowding and want of ventilation have long been known as fertile aids to the diffusion of typhus, and the disease has taken different names, as jail fever, camp fever, and hospital typhus, according to the different causes which favored its spread. Privation and want of sufficient food strongly predispose the system to receive the contagion, and famine in Ireland is invariably attended and followed by fever. The disease was formerly endemic in most of the large cities of Great Britain and Ireland, particularly in Ireland and Scotland, but improved municipal regulations have almost banished it from a number of them; its spread is in a great measure under the control of hygienic regulations, and its continuance as a distinct disease is due to their imperfection and neglect.—In the treatment of typhus, rigid attention to cleanliness, the abundant access of fresh air, frequent tepid sponging of the surface, and the support of the patient by a light nutritious regimen, are the main elements of success. In cases attended with great prostration, wine whey, wine, malt liquors, or distilled spirits must be used freely and frequently; and under their use cases apparently desperate often recover. The celebrated Dr. Huss of Stockholm, from an experience in 3,186 cases, prefers dilute phosphoric acid as a tonic in the commencement of almost all cases of typhus and typhoid fever, and regards it as alone sufficient to relieve or cure the majority of cases. The severest forms require the most powerful tonics, such as quinine, beef tea, brandy, &c., aided by phosphoric or other mineral acids. (See Typhoid Fever.)

TYPOGRAPHY. See Printing.

TYRANT, in ornithology. See King Bird.

TYRANT (Gr. *τυραννος*, a ruler or sovereign), a term used in ancient Greek history principally to designate the autocratic rulers of independent states who obtained their power not by legal appointment, but by usurpation, generally connected with the subversion of the previously established constitution. A despotic or bloody rule, however, was not originally implied in the appellation. The so called 30 tyrants of Athens, who on the termination of the Peloponnesian war received the sway over that city from the Spartan Lysander, did not all deserve that appellation in its more modern and odious sense.—For the "30 tyrants" in Roman history, see Gallienus.

TYRE (in classical writers, *Tyrus;* in the Hebrew Scriptures, *Tzor*, rock), the wealthiest and most powerful city of Phœnicia, founded by the Sidonians, in a naturally strong position on the coast of the Mediterranean, about 20 m. S. from Sidon. In later times it extended over a small adjacent island, the new part gradually becoming the more important, and the old receiving the name of Old Tyre (Παλαιτυρος). The latter is designated in the historical books of the Old Testament as the "stronghold" or "fortress" (*mibtzar*) Tzor, while, no doubt in allusion to its insular part, the city is called by Isaiah the "stronghold of the sea," and described by Ezekiel, in his glowing picture of its wealth, splendor, and maritime power, as situated "in the heart of the seas." Both parts withstood a long siege by Shalmaneser of Assyria, but only that built on the island is believed to have successfully resisted a longer one by Nebuchadnezzar; while Alexander the Great, by the construction of a mole from the mainland to the island, succeeded in reducing the whole of Tyre. This mole, gradually enlarged and strengthened by ruins and alluvial deposits, has since permanently connected the two sites of the ancient city, converting the island into a promontory. Even the ruins of the "daughter of Sidon" and mother of Carthage have mostly been covered by the sea. On the site now stands a poor village called Sur. (For the history of Tyre, see Phœnicia.)

TYROL, or Tirol, a province or crownland of Austria, bounded by Würtemberg, Bavaria, Saltzburg, Carinthia, Venetia, Lombardy, Switzerland, and Liechtenstein, between lat. 45° 39′ and 47° 46′ N., and long. 9° 35′ and 13° E.; area, 11,084 sq. m.; pop. in 1857, 851,016. It includes the Vorarlberg, which was formerly a separate district or province, and is divided into the 4 circles of Innspruck, Brixen, Trent, and Bregenz. The chief towns are Innspruck, the capital, Roveredo, Feldkirch, Botzen, Bregenz, and Brixen. The surface is throughout mountainous, and the scenery bears a strong resemblance to that of Switzerland. It is traversed from W. to E. by three chains of the Alps, which run nearly parallel to each other. The Rhætian Alps, which occupy the centre and are the loftiest, divide the waters which flow northward to the Danube from those that run to the Adriatic or the river Drave, and unite on the E. with the Noric Alps. The highest points in the Austrian empire are situated in this chain, Mt. Ortler being 12,852 feet above the sea, and the Gross-Glockner 12,776 feet. The northern chain forms the Tyrolese or German Alps; and the southern is sometimes called the Trent Alps, and is united on the E. with the Carnic Alps. The S. side of these chains is generally abrupt, but on the N. the descent is mostly gradual, and by terraces with many valleys between them. Many of the summits are above the line of perpetual snow, and about 160 sq. m. are covered with glaciers. These chains are crossed by several of the lowest passes of the Alps, the most important of which are the Brenner, Malserheide, Timbljoch, Arlberg, Schlopberg, Achen pass, and the pass near San Pellegrino. Many rivers have their sources in the Tyrol, and it is watered by numerous streams and mountain torrents. The most important rivers are the Inn, which enters the Tyrol from Switzerland by a narrow valley at Finstermünz, and has a course of about 100 m. within the country; and the Adige, which has an E. S. E. course, and after its junction with the Eisack becomes navigable; but the currents of both are rapid, more especially after the melting of the snow on the mountains. The Tyrol has numerous lakes, the largest of which are Lakes Idro, Garda, Constance, Achen, and Plau, the first 3 of which lie on the frontiers. Granite is the commonest rock on the mountain ridges; but the geological formations on the N. and S. sides differ very considerably. On the N. the rocks are almost entirely calcareous, and on the S. the granite is overlaid by primitive schists and limestones, while lower down a great variety of rocks appear. The most valuable minerals are gold, copper, lead, iron, calamine, coal, rock salt, and fine marble. The climate in the lateral valleys, and in the N. and W., is very severe, but in the S. it is much milder. The mean annual temperature at Innspruck, 1,700 feet above the sea, is 49°, while at Botzen, 1,010 feet lower, it is 55.30°. The annual fall of rain averages 26 inches, and is pretty equal throughout the country. About ⅓ of the surface is occupied by perpetual snows, glaciers, and barren rocks; an equal space by forests; and the remainder by extensive tracts of natural pasture, by arable land, vineyards, and gardens. Wheat, rye, barley, and oats are grown, and in some places buckwheat is extensively cultivated. Millet, flax, hemp, and tobacco are also raised; and maize forms one of the principal crops in the valleys that lie on the borders of Italy. Fruit of different kinds is abundant in the same locality, and a considerable quantity of wine and silk is produced, Large numbers of cattle are kept, and goats and sheep are particularly numerous, but pigs are rare. The wild animals include the chamois, hare, and marmot; and there are several birds of prey, especially eagles.—About ⅝ of the population are of German descent, and the remainder Italians; both are Roman Catholics, and distinguished for the strength of their devotional feelings. They are honest, frank, and very industrious. About 30,000 of them annually migrate during the summer months to the surrounding countries, and return about the end of autumn with the profits of their labor. The manufactures, though numerous, are not very extensive, and include lace, embroidery, gloves, hardware, cutlery, and toys. Mines of copper and lead are worked, and gold and silver are procured in small quantities. An important transit trade is carried on, but the commerce of the country is not very extensive, and consists chiefly of dried fruit, cheese, wine, cattle, timber, iron, salt, &c. Innspruck is connected by railway with Munich and Saltzburg, and Botzen with Verona. There is a university at Innspruck, and the province has 45 superior, several infant, and between 3,000 and 4,000 popular schools.—In early times the Tyrol was inhabited by the Rhætians and Celtic tribes, and under the Roman empire formed part of Rhætia, having been subdued in the reign of Augustus. During the decline and after the fall of the western empire it was several times ravaged by barbarians, was successively occupied by the Ostrogoths, Lombards, Bavarians, and Franconians, and afterward divided into petty lordships, all of which paid tribute to the dukes of Bavaria. These lordships subsequently became united, and the whole of the territory passed to the house of Austria by inheritance in 1363. Austria retained peaceable possession of it till 1805, when she was compelled to cede it to Bavaria by the peace of Presburg. The people were highly dissatisfied with this arrangement, and under Andreas Hofer rebelled in 1809; but the Bavarians and French reëntered the country, and the people were subdued. In the last action the women fought by the side of the men, and nearly 400 of them were cut down by the enemy's cavalry. The Tyrol was restored to Austria by the congress of Vienna.

TYRONE, a N. county of Ireland, province of Ulster, bounded by Londonderry, Lough Neagh (which separates it from Antrim), Armagh, Monaghan, Fermanagh, and Donegal; area, 1,260 sq. m.; pop. in 1861, 238,426. The chief towns are Strabane, Dungannon, and Omagh. The surface is greatly diversified, and has many fertile plains and valleys. The only considerable rivers are the Foyle and Blackwater. Coal is found, but turf is the usual fuel. The Londonderry and Enniskillen railroad passes through Tyrone near Strabane. The county returns two members to parliament.

TYRREL, an E. co. of North Carolina, bordering on Albemarle and Pamlico sounds, and including Roanoke island in the latter, intersected by Alligator river; area, 320 sq. m.; pop. in 1860, 4,943, of whom 1,597 were slaves. The surface is level and the soil sandy. The productions in 1850 were 7,952 bushels of wheat, 149,385 of Indian corn, and 20,745 of sweet potatoes. There were 21 shingle mills, 12 churches, and 400 pupils attending public schools. A large portion of the county is covered with swamps and heavy forests of pine, cypress, and red cedar; and shingles, staves, tar, and turpentine are extensively exported. Capital, Columbia.

TYRTÆUS, a Greek poet of the 7th century B. C., variously stated to have been a native of Attica and of Lacedæmon. An ancient tradition recounts that, in the second Messenian war, the Spartans were commanded by an oracle to apply to the Athenians for a leader. In answer the Athenians, opposed to the extension of the Spartan dominion, sent Tyrtæus, a schoolmaster of low family and reputation, and deformed, as the most unfit person they could select for the purpose. But he so inspired the Spartans with his war songs, that the Messenians were subdued to the condition of helots. His poems were of two kinds: marching songs in anapæstic measures, to be sung with the music of the flute; and elegiac exhortations to constancy and courage. The fragments of them are in Gaisford's *Poetæ Minores Græci* (translated into English verse by Polwhele, 1786–'92).

TYRWHITT, Thomas, an English author, born in London, March 29, 1730, died there, Aug. 15, 1786. He was educated at Eton and at Queen's college, Oxford, where he took his degree of A.B. in 1750, and in 1756 was appointed under secretary of war, which position he exchanged in 1762 for that of clerk of the house of commons. He resigned office in 1768, and devoted the remainder of his life to literary pursuits. Two years previous to his death he was appointed a trustee of the British museum, to which institution he bequeathed a portion of his valuable library. His principal works in English are: "Observations on some Passages in Shakespeare" (8vo., Oxford, 1766), and an edition of Chaucer's "Canterbury Tales," with an "Essay on his Language and Versification, an Introductory Discourse, and Notes" (5 vols. 8vo., London, 1775–'8). He also aided in the publication of Chatterton's "Poems by Rowley," and supported the authorship of them by Chatterton in a reply to the strictures of Dean Miller and Jacob Bryant. He was an accomplished Greek scholar, and published notes, animadversions, and conjectures on writings by Plutarch, Babrius (the supposed author of Æsop's fables), Euripides, Strabo, and others. His principal work in this department of literature was an edition of Aristotle's "Poetics," published posthumously in 1794.

TYTLER. I. William, a Scottish author, born in Edinburgh, Oct. 12, 1711, died Sept. 12, 1792. By profession he was a writer to the signet, but his reputation rests chiefly upon a work published in defence of Mary, queen of Scots, entitled an "Inquiry, Historical and Critical, into the Evidence against Mary, Queen of Scots," &c. (1759), and which gained him from Burns the title of "revered defender of the beauteous Stuart." He also published the "Poetical Remains of James I., King of Scotland" (8vo., Edinburgh, 1783), and some miscellaneous papers. II. Alexander Fraser (Lord Woodhouselee), a Scottish jurist and author, son of the preceding, born in Edinburgh in Oct. 1747, died there, Jan. 5, 1813. He was called to the bar in 1770, and in 1786 was appointed professor of universal history and Roman antiquities in the university of Edinburgh, in which capacity he prepared a course of lectures subsequently embodied in his well known "Elements of General History" (Edinburgh, 1801), afterward published in "Murray's Family Library." In 1790 he was appointed judge advocate of Scotland, and in 1802 a judge of the court of session, with the title of Lord Woodhouselee. His remaining works comprise an "Essay on the Principles of Translation," a "Life of Lord Kames," a treatise on "The Law of Courts Martial," two supplements to the "Dictionary of Decisions," and a variety of miscellaneous minor publications. He was the intimate friend of Dugald Stewart, Scott, Mackintosh, Mackenzie, and other eminent authors, and one of the most estimable and accomplished gentlemen of his time. III. Patrick Fraser, a Scottish author, son of the preceding, born in Edinburgh, Aug. 30, 1791, died in Malvern, England, Dec. 24, 1849. He was admitted in 1813 into the faculty of advocates, and for many years steadily practised his profession, which he finally relinquished for the more congenial pursuit of literature. His first literary efforts of importance were published in "Blackwood's Magazine," to which he became a contributor at the time of its first appearance in 1817; and somewhat later he produced a "Life of Crichton" and a "Memoir of Sir Thomas Craig of Riccarton." In 1822 he became one of the founders of the Bannatyne club, a circumstance which drew him into still closer association with literary men and antiquaries; and about 1825, at the suggestion of his friend Sir Walter Scott, he commenced his "History of Scotland," the work on which his reputation mainly rests, and which was completed in 1843, after 18 years of labor, in 9 vols. It embraces the period between the accession of Alexander III. in 1249 and the union of the crowns of England and Scotland in 1603, professes to be built upon "unquestionable muniments," and is still the standard work on the subject. The article "Scotland" in the "Encyclopædia Britannica" is also by Mr. Tytler. His remaining works comprise a "Life of Wickliff," published anonymously in 1826; "Lives of Scottish Worthies," forming 3 vols. of "Murray's Family Library;" a "Life of Sir Walter Raleigh," containing many new facts carefully digested from state papers; a "Historical View of the Progress of Discovery in America;" a "Life of King Henry VIII.;" and a number of minor productions. The latter part of his life was passed in England. His biography, written by the Rev. John Burgon (1859), represents him as a pious, cheerful, and affectionate man, beloved by all who knew him. In addition to his other acquirements, he was an excellent musician, and wrote verses considerably above mediocrity.

TZETZES, Joannes, a Greek scholar and poet, who flourished at Constantinople about the middle of the 12th century. He was distinguished with the title of grammarian, then commonly given to the learned. His works consist of poems, scientific treatises, and commentaries on ancient authors. His poems are the *Ιλιακα*, containing the whole Trojan story from the birth of Paris to the return of the Greeks from Troy; *Βιβλος ιστορικη*, more commonly called *Chiliades*, a collection of 668 mythical and historical stories; and *Carmen Iambicum*, on the education of children. Of his commentaries, only those on the Iliad, on Hesiod, and on Lycophron have been printed.

TZSCHIRNER, Heinrich Gottlieb, a German theologian, born at Mitweida, Nov. 14, 1778, died Feb. 17, 1828. He studied theology at Leipsic, became academic *Docent* at Wittenberg, entered holy orders in 1801, and was appointed professor of theology at Wittenberg in 1805, and at Leipsic in 1809. He accompanied as chaplain the troops of Saxony from Weimar to Tournay in 1813, and became the successor of Rosenmüller as superintendent at Leipsic in 1815, and prebendary of Meissen in 1818. He was one of the most effective opponents of the Catholic reaction in Germany. Among his more important works are a continuation of the church history of Schrökh (2 vols., Leipsic, 1810); *Protestantismus und Katholicismus aus dem Standpunkte der Politik betrachtet* (1822; translated into English, French, and Dutch); *Das Reactions-System* (1824); *Briefe eines Deutschen an die Herren Châteaubriand, De Lamennais*, &c. (edited by Krug, 1828); *Vorlesungen über die christliche Glaubenslehre* (by Hase, 1829); and *Der Fall des Heidenthums* (unfinished, by Niedner, 1829). He was highly esteemed as an academic lecturer and pulpit orator, and published several volumes of sermons.

U

U, the 21st letter and 5th vowel of the English alphabet. It is not found in the Semitic languages, which have no distinct letters for vowels proper, and was probably originally wanting in the Greek, in which its modern equivalent is *ου*; in the Hebrew its place is supplied by the letter *vav*, and in the Armenian by *hioun*, both of which are pronounced sometimes as vowels and sometimes as consonants. In the Latin also it frequently had the force of a consonant, as in the words *uaco*, *uelox*, *silua*, now written *vaco*, *velox*, *silva*. It was in fact constantly confounded with V, and for some time a distinction was made between U vowel and U consonant, the latter name being applied to the character V, which did not come into use until after U. In the first books printed with Roman characters V was used as the capital for both sounds, and *u* as the small letter. In the Gothic alphabets the distinction was made much earlier than in the Latin. In English, *u* has 4 sounds, as exemplified in the words *but*, *bull*, *unite*, and *rule*. In the last it has the sound of *oo*, which is the normal one of the Italian, Spanish, German, and Slavic *u;* the 3d is pronounced as if the *u* were preceded by *y*. In French the letter has a sound of its own, which cannot be represented in our tongue, and resembling the German *ü*.—U is interchangeable with *a*, as in the Arabic definite article, which is rendered *ul* and *al*, or in Germ. *Hut*, Eng. *hat;* with *i*, as Lat. *maxumus* and *maximus;* with *o*, as Lat. *dulcis*, It. *dolce;* with the diphthongs *œ* and *oi*, as Lat. *cura*, old form *coira* or *cœra*, Lat. *murus*, Gr. *μοιρα*; with *au*, as Lat. *mus*, Ger. *Maus;* with *e*, as Lat. *Siculus*, Gr. Σικελος, Lat. *tabula*, Ger. *Tafel*, Ger. *Ulme*, Eng. *elm;* with *l*, as Eng. *stout*, Ger. *stolz*, Fr. *autel*, Eng. *altar*. U never occurs in ancient Latin inscriptions, V being used instead. (See LANGUAGE, vol. x. p. 298.)

UBICINI, JEAN HENRI ABDOLONYME, a French author, born in Issoudun, department of Indre, Oct. 20, 1818. He was educated at the lyceum of Versailles, and for several years taught rhetoric at the college of Joigny. In 1846 he visited Italy, and afterward travelled in Greece, Turkey, and the Danubian principalities. Being at Bucharest when the revolution broke out there in 1848, he took an active part in it, and became secretary of the provisional government. When the Turkish and Russian troops occupied Wallachia, he returned to France, after visiting Constantinople, and published *Lettres sur la Turquie* (2 vols., 1849–'51; translated into English, London, 1856); *La question d'Orient devant l'Europe* (1854); *La Turquie actuelle* (1855); *Les provinces Roumaines*, forming part of the *Univers pittoresque* (1856); *La question des principautés Danubiennes devant l'Europe* (1858); and an introduction to the "Ballads and Popular Songs of Roumania" (1855). He has also translated the *Saturnalia* of Macrobius (1845) and edited the works of Voiture (2 vols. 12mo., 1856), and for two years was editor of the *Revue de l'Orient;* beside which he has written for the Paris *Presse* and *Siècle*, and the *Courrier de Paris*.

UCCELLO, PAOLO, an Italian painter, born in Florence about the middle of the 14th century, died, according to Vasari, in 1432. He was a contemporary of the sculptors Ghiberti and Donatello, and the first painter who developed the principles of perspective. He painted principally in fresco, and was fond of depicting birds and animals, an example of which occurs in his illustrations of the histories of Adam and Eve and of Noah and the deluge, in the church of Sta. Maria Novella in Florence. Few of his works now remain.

UDALL, NICHOLAS, an English author, born in Hampshire in 1506, died in 1564. He was educated at Corpus Christi college, Oxford, was master successively of Eton and Westminster schools, and in the early part of the reign of Edward VI. was appointed to a canonry at Windsor. He published "Flovres for Latyne Spekynge" (London, 1533), a series of selections from Terence; some translations from the Latin works of Erasmus; and a Latin tragedy, *De Papatu* (1540); but his chief claim to remembrance is that he was probably the first writer of regular English comedies, divided into acts and scenes. Of these Wood says that he wrote several, but only one is extant, entitled "Ralph Royster Doyster," reprinted by the Shakespeare society (London, 1847).

UDINE, or UDIGE, a town of Austrian Italy, government of Venice, capital of the delegation of Udine or Friuli, situated in an extensive plain on the canal of La Roja, 80 m. by railroad N. E. from Venice, and 40 m. from Trieste; pop. about 30,000. It is walled and fortified, and has a fine cathedral ornamented with marble pillars, bass-reliefs, and paintings, a lyceum, a gymnasium, several hospitals and charitable institutions, and a monumental pillar, by Camalli, in one of the public squares, erected to commemorate the peace of Campo Formio, that village being but 1¼ m. from Udine. A height near the centre of the town is occupied by a castle which has been converted into a prison. The Campo Santo is one of the finest cemeteries in Europe. The principal manufactures are silk, linen, and woollen goods, earthenware, hardware, paper, leather, and liqueurs.

UDO. See AUDIUS.

UGGIONE, MARCO DA. See OGGIONE.

UHLAND, Johann Ludwig, a German lyric poet, born in Tübingen, April 26, 1787. He was educated at the university of his native place, where he applied himself to legal studies, and after being an advocate received in 1810 the degree of doctor of laws. He first appeared in print in Seckendorf's *Musenalmanach* (1806 and 1807), in *Der Poetische Almanach* (1812), and in *Der Deutsche Dichterwald* (1813). After a literary journey to Paris, he began the practice of law in Stuttgart, in which city he also held for a long time a position in the office of the minister of justice. The national struggle against the French during the years 1813–'15 strongly excited his feelings; and when the king of Würtemberg determined in 1815 to give his people a new constitution, Uhland, who was a strong adherent of the liberal party, took an active part in the contest between the supporters of the old and new systems. He wrote numerous lyrics, the influence of which was not confined to Würtemberg, though relating to Würtemberg interests. In 1815 appeared the first collection of his *Gedichte*, and from that time to 1819 his poetic labors were arduous, but were interrupted by the share he took in political movements, and also by his application to severer literary studies. In 1819 and 1820 he was elected from Tübingen, and later from Stuttgart, to the representative assembly of Würtemberg, where he exerted much influence. In 1822 he published an essay *Ueber Walther von der Vogelweide*. In 1830, having given up his legal practice, he was made extraordinary professor of the German language and literature in the university of Tübingen, but this position he resigned in 1833, as he could not be released from his duties in order to attend the sittings of the diet, to which he was a deputy, and in which he was one of the most prominent members of the constitutional opposition. In 1836 appeared at Stuttgart his work entitled *Ueber den Mythus der nordischen Sagenlehre von Thor*, which was followed in 1844–'5 by a collection of popular songs under the title of *Alter hoch- und niederdeutscher Volkslieder*, both works being the fruits of profound researches into the literary history of the middle ages. He declined to appear as a candidate in the election of 1839, and lived for several years in retirement. In 1848 he was sent by the electoral division of Tübingen to the national assembly at Frankfort, where he acted with the liberal party. Since this he has remained in retirement. Beside the works already mentioned, he has written two dramas, *Herzog Ernst von Schwaben* (Heidelberg, 1817), and *Ludwig der Baier* (Berlin, 1819). Several of his songs have been translated into English by Longfellow, and a translation of some of his poems, with a memoir by A. Platt, has been published in England (London, 1848).

UHLICH, Leberecht, a German rationalistic theologian, born in Köthen, Feb. 27, 1799. He studied theology at Halle, received an extraordinary professorship at Köthen in 1820, and became pastor of a church at Diebzig and afterward at Aix la Chapelle. Having incurred the enmity of the duke of Anhalt by a biography which he had written of his highness, he lost his employments and removed to Prussia, where he occupied himself in the labors of the ministry. In 1841 he established, with several associates of rationalistic tendencies, certain theological conferences out of which sprang the society of "Friends of Protestantism," with Uhlich as its president. The society was broken up by the Prussian government in 1845, and the president ordered to confine himself to his parish. He was soon after invited to Magdeburg as a preacher. His opinions on baptism here involved him in difficulties, and having been suspended by the consistory, he joined the free church of that city. He is a moderately voluminous writer.

UIGURS. See Turks.

UKRAINE (Pol. *Ukraina*, border land), formerly the name of a S. E. province of independent Poland, extending on both sides of the Dnieper, and bordering on the territories occupied by the Tartars. Its limits frequently varied, its possession being contested by the Turks, Tartars, and Russians. In later times it was divided into Polish and Russian Ukraine. Since the first dismemberment of Poland it has entirely belonged to Russia, and the name is now generally used as identical with Little Russia, comprising the governments of Kiev, Tchernigov, Pultowa, and Kharkov. The country forms an extensive and for the most part exceedingly fertile plain, watered by the Dnieper and its lower affluents, and inhabited chiefly by Cossacks. (See Cossacks.)

ULEMA (the Arabic plural of *alim*, wise), the collective name of the body of learned men in Turkey. In its strict sense the ulema comprehends the professors of law and divinity, the law as well as the religion of the Turks being grounded upon the Koran. The head of the ulema is the mufti; next to him come the cadileskiers, of whom there are two, one for Europe and one for Asia; the third class are the mollahs, who are the superior judges in the provinces; and after them are the cadis, who are the lowest officers of justice. The cadileskiers have a voice and vote in the divan, and all cadis are appointed by and subject to them. In a more enlarged sense, ulema comprehends beside these the religious teachers and officers.

ULFILAS, Ulphilas, or Wulfilas, a Gothic bishop, born among the Goths in 311, died in Constantinople in 381. He belonged to a family of Christian Greeks of Cappadocia, whom the Goths had carried into captivity about 267. He was educated in the Gothic language, and in 341 became Arian bishop of those Goths who dwelt between the Danube and Mt. Hæmus. In 360 he was present at the Arian synod of Constantinople, and at the time of his death had gone thither to attend a disputation. He repeatedly led his people across the Danube into lower Mœsia, and exercised a great and salutary influence among them; but he is now chiefly remembered by his translation of the Scriptures into the Mœso-Gothic, which is the earliest specimen extant of the Teutonic language. This version included the Old and New Testaments, with the exception of the books of Kings. Before the translation could be made he was obliged to frame a new alphabet of 24 letters, 4 of which were invented by himself in order to express sounds unknown to Greek and Latin pronounciation. The version was in constant use by the various tribes of Goths so long as they preserved their nationality; but only a portion of it now exists. (See Gothic Language and Literature.)

ULLMANN, Karl, a German theologian, born in Epfenbach in the Bavarian Palatinate, March 15, 1796. He studied philosophy and theology at the universities of Tübingen and Heidelberg, and in 1819 became *Privatdocent* of theology at the latter; in 1821 was promoted to an extraordinary professorship; and in 1829 he accepted a call as ordinary professor to Halle, but in 1836 returned to Heidelberg. In 1833 he was appointed by the grand duke of Baden "evangelical prelate" (bishop of the state church) and member of the supreme ecclesiastical council. This place he retained until 1860, when he resigned. His first important work was a monograph on Gregory of Nazianzus (Darmstadt, 1825). In 1828 he commenced with his colleague Umbreit the publication of the *Studien und Kritiken*, which counted among its contributors theologians like Schleiermacher, Lücke, Dorner, and Rothe, and established for itself the reputation of being one of the best theological quarterlies of Protestantism. The first article, contributed by Ullmann, "On the Sinlessness of Christ," is one of his chief productions. In 1830 he published against Hengstenberg, who had demanded the removal of two theological professors of Halle charged with rationalism, a memoir in defence of the liberty of teaching. A work on "Johann Wessel, a Predecessor of Luther" (Hamburg, 1834), was afterward enlarged by him and published under the title of *Reformatoren vor der Reformation* (2 vols., Hamburg, 1841–'2). The most important of his other works is *Ueber das Wesen des Christenthums* (4th ed., Hamburg, 1855). Several of the above named works have been translated into English.

ULLOA, Antonio de, a Spanish mathematician and naval officer, born in Seville, Jan. 12, 1716, died in the Isla da Leon, near Cadiz, July 3, 1795. He was educated for the navy, became in 1733 a member of the royal marine guards, and in 1735 received the commission of lieutenant, and was sent to South America with the French academicians who were commissioned to measure a degree of the meridian at the equator. He labored strenuously to advance the geodetical operations, which were begun in June, 1736, near Quito, but was constantly called away from his scientific duties to assist in putting the coast in a state of defence against Lord Anson's expedition. In Oct. 1744, he embarked for Europe in a French vessel, which was chased by an English privateer, and sought refuge in the harbor of Louisburg in Cape Breton; but as that city had lately fallen into the hands of the British, he was taken prisoner and carried to London, where his scientific friends obtained his liberty, and made him a member of the royal society. On his return to Spain in 1746 he was appointed to the command of a frigate, and created a commander of the order of Santiago. He immediately set about writing a history of the expedition, while the scientific portion of the report was written by his companion, Jorge Juan (4 vols., Madrid, 1748). After this he was employed by the Spanish court in making tours of observation in various countries of Europe, in 1755 went a second time to America, and after the peace of 1763, by which Louisiana was ceded by France to Spain, was made governor of that region. He arrived there in March, 1766, but found the inhabitants unwilling to submit to Spanish domination. The troops he brought with him were few, and he was compelled to govern the country through the French troops commanded by Aubry. Though he seems to have sincerely desired to conciliate the people, their discontent broke out into an open riot, in consequence of which he was obliged to leave the colony, in the government of which he was succeeded by O'Reilly. Returning to Europe, he published in 1772 a volume of essays on the natural history and antiquities of America, and in 1778 "The Marine, or the Naval Force of Europe and Africa," and "Observations of a Solar Eclipse made at Sea." He was now a lieutenant-general in the naval service, and was appointed to the command of a squadron intended to capture off the Azores an English merchant fleet heavily laden, and afterward to sail to Havana and join an expedition fitting out against Florida. Absorbed in his astronomical investigations, Ulloa forgot to open his sealed orders, and after cruising about for two months without success returned. He was tried in 1780 by a court martial demanded by himself, and, though acquitted, was never again allowed to engage in active service. He was one of the most munificent promoters of science and the arts in Spain, had a large share in establishing the observatory of Cadiz, encouraged woollen manufactures, and finished the havens of Ferrol and Carthagena. He was also the means of furnishing Spain with its first cabinet of natural history, and its first laboratory of experimental metallurgy.

ULM, a town of Würtemberg, situated on the left bank of the Danube, on both sides of its tributary the Blau, and opposite the mouth of the Iller, 45 m. S. S. E. from Stuttgart, with which it is connected by railway; pop. in 1858, 21,858, exclusive of the garrison. The Danube here forms the boundary between Würtemberg and Bavaria. The rivers are crossed by several bridges, one of which connects the town with New Ulm, a village situated in Bavaria on the opposite side of the Danube. The cathedral of Ulm, built between 1377 and 1488, is a fine specimen of Gothic architecture and German art in the middle ages. It is 485 feet long, 200 feet broad, and 150 feet high, and the western tower 220 feet. It contains several valuable monuments and works of art, including stained glass windows, paintings, carved work, and a remarkably fine organ. There are several other churches, a museum, a library, many charitable institutions, a theatre, and a palace in which one of the princes of Würtemberg resides. Linen goods, brass ware, leather, paper, &c., are manufactured.—Ulm was for many years an imperial free city, and its wealth became proverbial; but its prosperity has been much injured by its military importance, its possession having been contested in nearly all the great German wars. It surrendered to Napoleon, Oct. 17, 1805, when 24,000 Austrian troops under Gen. Mack were made prisoners. It is at present garrisoned by the troops of Würtemberg, Bavaria, and Austria.

ULPIAN (DOMITIUS ULPIANUS), a Roman jurist, assassinated at Rome, A. D. 228. He was of Tyrian origin, and during the reigns of Septimius Severus and Caracalla was engaged in writing juristical works. When Elagabalus ascended the throne in 217 he was banished, but on the accession of Alexander Severus in 222 he became one of the chief advisers of that monarch, who made him *Scriniorum magister*, *consiliarius*, and *præfectus annonæ*. He also held the office of prætorian prefect. He was killed by the soldiers in the presence of the emperor and his mother. Ulpian was one of the most distinguished of the Roman jurists, and from his works, which were very numerous, a much larger proportion of excerpts was taken by the compilers of the Digest in the time of Justinian than from any other legal writer.

ULRICI, HERMANN, a German philosopher and critic, born in Pförten, Lower Lusatia, March 23, 1806. He was educated at Halle and Berlin, and practised law for a time, but after the death of his father in 1829 devoted himself to the study of history, poetry, and art. In 1834 he was made extraordinary professor in the university of Halle, which position he still holds. Among his works are: *Charakteristik der antiken Historiographie* (Berlin, 1833); *Geschichte der Hellenischen Dichtkunst* (2 vols., Berlin, 1835); *Ueber Shakspeare's dramatische Kunst* (Halle, 1839), in which he advances the idea that the object of the poet was the maintenance of a religious theory, Christian in its character with a Protestant tendency; *Ueber Princip und Methode der Hegel'schen Philosophie* (1841); *Das Grundprincip der Philosophie* (2 vols., Leipsic, 1845–'6), &c.

ULSTER, a S. E. co. of New York, bounded E. by the Hudson river, and drained by the Esopus, Rondout, and Wallkill creeks; area, 1,204 sq. m.; pop. in 1860, 76,379. The surface is broken by the Catskill and Shawangunk ridges, and the soil is generally best adapted to grazing. The productions in 1855 were 20,185 bushels of wheat, 278,105 of oats, 242,229 of Indian corn, 70,676 of buckwheat, 134,589 of potatoes, 397,754 of apples, 64,795 tons of hay, and 1,669,631 lbs. of butter. There were 2 forges, 5 furnaces, 2 cotton and 4 woollen factories, 4 paper mills, 11 wintergreen distilleries, 5 grist mills, 95 saw mills, 80 tanneries, 100 churches, 7 newspaper offices, and in 1858 25,556 pupils attending public schools. Iron ore, limestone, slate, and marl are found, and there are indications of the existence of coal, lead, plumbago, and alum. The Delaware and Hudson canal passes through the county. Capital, Kingston.

ULSTER, the northernmost of the four provinces of Ireland, bounded W. and N. by the Atlantic ocean, E. by the North channel and Irish sea, S. E. by the province of Leinster, and S. W. by that of Connaught, and comprised between lat. 53° 45′ and 55° 25′ N., and long. 5° 25′ and 8° 50′ W.; area, 8,527 sq. m.; pop. in 1861, 1,910,408, nearly ½ Protestants. It is divided into the counties of Antrim, Armagh, Cavan, Donegal, Down, Fermanagh, Londonderry, Monaghan, and Tyrone. The coasts are generally rugged and indented by numerous fine bays and harbors, the chief of which are Carlingford bay, Dundrum bay, Strangford lough, Belfast lough, Lough Larne, Lough Foyle, Lough Swilly, Mulroy bay, Sheep Haven, and Donegal bay. The principal rivers are the Erne, Foyle, Bann, and Lagan. A considerable part of the surface is mountainous, and two chains traverse the province from E. to W., the highest peaks being in the counties of Donegal and Down; Erigal in the former and Slieve Donard in the latter are respectively 2,460 and 2,796 feet high. Between these ranges there is an extensive tract of undulating ground, near the central part of which is situated Lough Neagh. The other largest lakes are Upper and Lower Lough Erne, Loughs Melvin, Shulin, Oughter, Derg, Esk, and Veagh. Ulster is the seat of the Irish linen manufacture, and about ¼ of the population of the province derive subsistence from it. Cotton is extensively manufactured about Belfast. Internal communication is facilitated by means of several railways and canals, and numerous excellent roads.—Ulster was partly conquered and held as an earldom under Henry II. by John de Courcy, from whom it was transferred to Hugh de Lacy; and by descent from him, through the De Burgh and Mortimer families, the title was merged in the crown of England under Edward IV. Numerous insurrections having occurred, in the reign of James I. means were adopted for forming settlements of English and Scotch emigrants, called in history the plantation of Ulster. It was intended by confiscation to break up the power of the native chiefs and drive them and their followers into Connaught; but a few of the Irish were allowed to remain. The grantees were termed "undertakers." Lots of 1,000 to 2,000 acres were conferred upon condition of their being settled by Scotch or English tenants; but the "Irish servitors" had the choice of taking either English or Irish tenants. Some of the trading companies and the corporation of the city of London obtained large grants, from which circumstance the prefix of London was placed before the town and county of Derry. A large proportion of the colonists were Scotch, and so many of their peculiarities have been transferred to the people of Ulster that in other parts of Ireland they are called Scotsmen.

ULTRAMARINE (Lat. *ultra*, beyond, and *marinus*, marine), a beautiful blue pigment, so named from the foreign sources from which it was originally obtained. It was formerly known only as a product of the mineral lapis lazuli, also called ultramarine. (See Lapis Lazuli.) From the analysis of this mineral chemists were led to produce the same compound artificially, and its manufacture is now carried on upon a large scale in Germany. The substance is mainly a silicate of soda and alumina, containing the sulphurets of iron and sodium. According to one method, it is produced by grinding together equal parts of silica, sulphur, and carbonate of soda, by which a bluish green mass is obtained. This is ignited in the air, and various finishing processes are applied to the bluish powder. The product is extremely cheap compared with the real ultramarine, and is inferior to it as a pigment. The ordinary sorts are largely used in calico printing, color printing, and dyeing, in paper staining, and in the manufacture of sealing wax; and their use is rapidly increasing. The best artificial ultramarine, prepared only for the use of artists, is a much more expensive material, owing to the great number and variety of processes required in its manufacture.—The principal ultramarine factory is that of Messrs. Zeltner and Heyne at Nuremberg; the buildings are said to cover 7 acres; the central one has 24 sides, is 136 feet in diameter, and contains 96 furnaces. There are beside various mills with numerous steam engines, extensive washing apparatus, long ranges of drying rooms, and store rooms for 5,000 or 6,000 cwt. of artificial ultramarine. The works usually give employment to about 200 persons.

ULTRAMONTANISM (Lat. *ultra montes*, beyond the mountains), a name applied to that view of the papal prerogatives in the Roman Catholic church which claims for the pope the absolute right of issuing obligatory decrees on points of doctrine or ecclesiastical discipline, without being bound to the assent of œcumenical councils, national churches, bishops, or secular governments. The term originated in France, where those holding such views of the papal power were charged by their opponents with sacrificing the rights of the bishops, nations, and councils, and with placing the centre of Catholicism, to an undue extent, "beyond the mountains," at Rome. The ultramontane system nowhere met with a greater resistance than in France, where in 1682 a national council of bishops opposed to it the liberties of the Gallican church. In Germany it was especially opposed by Febronius (Bishop Hontheim), and the convention of the archbishops of Mentz, Treves, Cologne, and Saltzburg, at Ems, in 1785. The secular governments endeavored to have the papal rights with regard to the Catholics of their countries determined by concordats or special conventions. The effort to secure by means of such conventions the largest possible extent of papal rights is also commonly designated as ultramontanism.

ULYSSES, or Odysseus (Gr. Ὀδυσσεύς), one of the most distinguished of the Greek leaders at the siege of Troy. According to the Homeric account, he was the son of Laërtes and Anticlea, and married Penelope, the daughter of Icarius, by whom he had a son named Telemachus. Ruling in Ithaca, it was with great difficulty that he could be induced to join the expedition against Troy. According to one form of the legend, he simulated insanity to avoid taking part; but the shrewdness of Palamedes exposed the deception by placing in the furrow where Ulysses was ploughing his infant son Telemachus. The falsity of his madness being thus disclosed, he joined the Grecian fleet at Aulis with 12 ships, and when the expedition had reached Tenedos was sent with Menelaus to Troy to demand Helen and the stolen property. The mission was unsuccessful. In the 10 years' war he was distinguished for his prowess as a warrior, but far more for his eloquence, sagacity, and inexhaustible resources under difficulties. After the death of Achilles his armor was offered as a prize to the greatest warrior in the Greek army, and Ulysses and Ajax became rivals for the honor, the former proving successful. By his contrivance the Palladium was carried away from Troy by stealth, and he was one of the heroes concealed in the wooden horse which the Trojans incautiously introduced into the city. His 10 years' wanderings after the close of the siege, which form the subject of the Odyssey, are still more celebrated. After various adventures he was thrown upon the coasts of the Lotophagi, where his companions, having eaten of the lotus, wished to remain. He however succeeded in inducing them to depart, sailed to the island of the Cyclops, and with 12 of his followers entered the cave of Polyphemus, who devoured 6 of his companions. In order to save himself and the rest, Ulysses, managing to make the giant drunk with wine, put out his one eye with a burning pole, and then tying himself and his companions under the bodies of the sheep, when these were let out of the cave they were carried out with them. Polyphemus implored his father Neptune to visit Ulysses with his vengeance, and the remainder of his voyage was constantly disturbed by the enmity of the god of the sea. Reaching the island of Æolus, Ulysses was presented by that deity on his departure with a bag containing the winds that were to bring him home; but his followers opened the bag without his knowledge, the winds escaped, and the vessels were driven back to the island, where the angry Æolus refused any further assistance. After 6 days he reached the country of the cannibal Læstrygones, from which he escaped with only one ship. Thence he sailed to Ææa, inhabited by the sorceress Circe, who changed part of his followers into swine. Through the aid of Mercury he was enabled to overcome her spells, and his companions resumed their human shape. Circe now treated them kindly, and by her advice Ulysses descended into Hades to consult the seer Tiresias. The prophet assured him that every thing would yet turn out right if the herds of Helios in Trinacria should be left unharmed. Returning to Ææa, he was carried to the island of the sirens, but by filling the ears of his companions with wax and tying himself to the mast he passed them in safety. Going between Scylla and Charybdis, the former devoured 6 of his followers. Coming to Trinacria, he was compelled by his companions, much against his will, to land. There they were detained by storms, and while he was sleeping some of the finest of the cattle of Helios, which they had sworn not to touch, were killed and eaten by his followers. As soon as they were again on the open sea, another storm arose, and the vessel was destroyed by Jupiter with a stroke of lightning, all on board being drowned with the exception of Ulysses. He was carried to the island of Ogygia, inhabited by the nymph Calypso, who promised him immortality and eternal youth if he would marry and remain with her. But he longed to revisit his native land, and after a stay of 8 years embarked on a raft, and reached Scheria, from which place he was sent to Ithaca in a ship, having been absent 20 years. He found his wife beset by suitors (see PENELOPE), made his appearance first as a swineherd, and then disclosed himself to his son Telemachus, and by the assistance of the goddess Minerva, whose special favorite he was, succeeded in killing the suitors and the faithless servants. Of the latter years of his life and of the manner of his death there are different accounts. In one, his son Telegonus by Circe, being sent to look for his father, and being shipwrecked on Ithaca and beginning to plunder for the sake of obtaining food, was attacked by Ulysses and Telemachus, and in the contest that followed Telegonus slew his own father.

UMBER. See PAINTS, vol. xii. p. 678.

UMBRE, a wading bird of the heron family, and genus *scopus* (Briss.). The bill is longer than the head, elevated at the base, compressed laterally, keeled above and below, and a little bent at the point; the nostrils prolonged in a furrow; 3d and 4th quills equal and longest; tail short and even; tarsi longer than middle toe and scaled; front toes united by membrane to first phalanx, the hind one resting wholly on the ground; claws short and slightly curved. The only described species, the tufted umbre (*S. umbretta*, Gmel.), is 20 inches long, with a bill of 3½; the color is a uniform umber brown, the wings and tail barred with darker; the male has an occipital crest about 4 inches long, of loose feathers. It is a native of Africa, but its habits are not well ascertained.

UMBREIT, FRIEDRICH WILHELM KARL, a German Protestant theologian, born at Sonneborn, Gotha, April 11, 1795, died in Heidelberg, June 11, 1860. He studied theology and the oriental languages at the university of Göttingen, especially under Eichhorn, and made himself favorably known as early as 1816 by a prize essay, *Commentatio Historiam Emirorum-al-Omrah ex Abulfeda exhibens* (Göttingen, 1816). He became in 1818 *Privatdocent* at the university of Göttingen, in 1823 ordinary professor of philosophy, and in 1829 ordinary professor of theology. He is the author of a number of valuable exegetical works on the Old Testament, in which he endeavored to blend a strictly philological mode of interpretation with the theological and æsthetic. His works of this class are: *Lied der Liebe* (Göttingen, 1820); *Uebersetzung und Auslegung des Buches Hiob* (Heidelberg, 1824); *Commentar über die Sprüche Salomos* (Heidelberg, 1826); *Christliche Erbauung aus dem Psalter* (Hamburg, 1835); *Grundtöne des Alten Testaments* (Heidelberg, 1843); and *Commentar über die Propheten des Alten Testaments* (4 vols., Hamburg, 1841–'6), his principal work. He was also, with his friend Dr. Ullmann, editor of the *Studien und Kritiken*, the principal theological quarterly of Protestant Germany.

UMBRELLA (Lat. *umbella*, a little shadow, an umbrella, from *umbra*, a shade), a folding shade or screen carried over the head, as a protection from the rain or the sun. When of small size and used by ladies only as a sunshade, it is called a parasol (Ital. *parare*, to ward off, and *sole*, the sun). The French call what we term umbrella *parapluie*, thus designating its use as a defence against rain. Umbrellas are made of a light jointed frame covered with silk, cotton, or alpaca, which can be expanded at pleasure or brought down snugly around the central stick. This stick is the foundation of the frame, and is furnished at its lower end with a proper handle for supporting it, and at the upper end with a metallic ring around which are hinged the upper ends of the light ribs, most commonly of whalebone, to which a cover is attached. Near the middle of each rib is hinged a slender metallic rod or stretcher, the lower ends of which all meet in a ring that slides from the handle up sufficiently far to spread out the ribs to the required extent. Modern improvements in umbrellas consist in the use of steel for the ribs, and of superior kinds of iron, japanned to protect it from rust, for the stretchers, and in the perfection of the joints. A substitute for whalebone in the ribs of umbrellas has recently been introduced in

England, in strips of second growth white oak, selected from buts not more than 6 feet from the ground. When perfectly straight and free from knots and curls, the wood is made, by a proper method of curing, superior to whalebone in tenacity and in resuming a straight condition after being bent and exposed to the weather. For the ribs of cheap umbrellas rattan is largely used. Vulcanized India rubber has been employed for all portions of the frame. Advantage has also been taken of the combined strength and lightness of hollow tubes to apply this principle to the sticks, ribs, and stretchers of umbrellas; and for making them more portable, the handles have been formed of tubes sliding one within another like a telescope, while the ribs formed of steel are furnished with a folding hinge or joint.—Umbrellas were used in eastern countries in ancient times, and were originally designed for sunshades only. They are seen represented upon old chinaware, and are figured upon ancient carvings at Persepolis. Niebuhr describes the princes of southern Arabia as returning from a mosque preceded by a retinue of soldiers, and with attendants at the side of each carrying a large umbrella. Those used by the Chinese, Japanese, and Siamese are made with a light frame of bamboo and covered with oiled and varnished paper, and differ from ours in presenting a surface nearly flat instead of sloping when spread out. The umbrellas of the Siamese kings are said to be made with several separate circles, one above another, while others are only permitted to use them with a single circle. Some of those used by eastern dignitaries are so large as to require several persons to carry them. The ancient Greeks and Romans had umbrellas, which appear from the paintings on vases to have been very much like those of the present time; they were used chiefly as a protection against the sun, and by ladies only. Among the Greeks it was customary for female slaves to carry the parasol over the heads of the ladies; and among the Romans parasols were common presents to ladies, and to hold them over their heads was one of the common attentions of lovers. Umbrellas were introduced into Europe at a comparatively recent period, and it is not yet 100 years that they have been in general use in England. Jonas Hanway, the philanthropist, is said to have been the first man who commonly carried one in the streets, and this at a time when their use was considered a mark of great effeminacy. They were at first kept only in the halls of houses of the first class, and were used for holding over persons as they stepped to their carriages.—In the United States the manufacture of umbrellas is in many places an important branch of industry. In Philadelphia it is said to employ directly about 1,500 persons, and the annual product of the sales is from $1,000,000 to $1,500,000. Machinery of a novel design has been applied to the production of some of the parts, and, as in the manufacture of guns, each piece is made with mathematical accuracy, and with such advantage that in one of the establishments (that of Wright brothers and co.) as many as 2,200 umbrellas and parasols are produced daily by the labor of only 450 hands. The annual consumption of silks and cottons for covering these is said to be full 1,000,000 yards, of rattan 200,000 lbs., of whalebone over 100,000 lbs., and of horn, bone, ivory, and other materials for ornamental mountings, about 75 tons. In Frankford, near Philadelphia, are establishments devoted to the manufacture of metal mountings, tips, &c. The handles are also produced in the separate works of the ivory and bone turners and carvers; and the carvings are equal to any of the same kind of work done in Europe.

UMBRELLA (Lam.), a genus of gasteropod mollusks, so called from the resemblance of the flattened shell to an umbrella. The animal has a very large tuberculated foot, deeply notched in front; the shell is small, merely covering the most important organs. The *U. umbellata* (Lam.), the Chinese umbrella shell, is a native of the Indian ocean.

UMBRELLA BIRD, the popular name of a singular South American bird, placed by the latest authors among the chatterers (*ampelidæ*), sub-family *gymnoderinæ* or fruit birds, and genus *cephalopterus* (Geoffr.). The bill is stout, long, flattened, gradually curved, with the tip notched and slightly hooked; wings moderate, rather pointed, with the 3d quill longest; tail short and rounded; toes long and slender, with curved claws. The *C. ornatus* (Geoffr.) is about as large as a crow, glossy black, with violet, blue, and metallic reflections on the crest and pectoral appendage. The head of the male is surmounted by a large crest of 50 to 80 feathers springing from over the nostrils, the lower half a white stiff shaft, and terminating each in a tuft of black hair-like feathers spreading in all directions, but principally forward; it arises from a contractile skin on the top of the head, and when erected almost hides the bill from view; it is 5 inches in length and about 4½ wide, somewhat resembling a beautiful blue umbrella, whence the above name. The skin of the neck is very loose, and from it grows a cylindrical fleshy process, about as thick as a goose quill, 1½ inches long, from which extends a tuft of imbricated feathers, bordered with metallic blue, and hanging down several inches. It is found in the islands of the great South American rivers, feeding principally on fruits, ejecting the stones when present from the mouth; it is arboreal in habit, and utters a very loud and deep note, which has gained for it from the tribes of the Rio Negro the name of piper bird.—The arapunga or bell bird (*procnia alba*, Thunb.) is about 12 inches long and pure white; it has a singular cylindrical fleshy appendage, with a few small feathers, arising from the base of the bill; the mouth is very wide, enabling it to swallow large berries and fruits; the voice resembles the tolling of a bell, and may be heard, according to Waterton, nearly 3 miles, and during the heat of the day, when most other birds are silent; it is a native of the forests of tropical South America.

UMBRIA, a country of ancient Italy, bounded N. by Cisalpine Gaul, E. and S. by the Adriatic, Picenum, and the territory of the Sabines, and W. by the Tiber, separating it from Etruria. Its principal cities were Ariminum (now Rimini), Pisaurum (Pesaro), Fanum Fortunæ (Fano), Mevania (Bevagna), Tuder (Todi), Narnia (Narni), and Spoletium (Spoleto). Its W. part was occupied by the Apennines; the E. stretched out toward the coast in fertile plains. Beside the Tiber, the principal rivers were the Rubicon, Ariminus (Marecchia), Pisaurus (Foglia), Metaurus (Metauro), and Æsis (Esino), all flowing into the Adriatic, and the Nar (Nera), an affluent of the Tiber. The inhabitants, the Umbri, were one of the most ancient races of the peninsula, and at an early period became the most powerful people of central Italy. Etruria was originally in their possession. The Romans overcame them in 307 B. C.—The name Umbria has been revived in modern times to designate a portion of what was recently the Papal States, comprised chiefly in the delegations of Spoleto and Perugia.

UMPQUA, a W. co. of Oregon, bounded W. by the Pacific ocean and drained by the Umpqua and Kowes rivers; area over 1,500 sq. m.; pop. in 1860, 1,250. The surface is hilly or undulating, and the soil is very fertile, producing wheat, Indian corn, rye, oats, and other grains in great abundance. Capital, Umpqua City.

UMRITSIR. See Amritseer.

UNAU. See Sloth.

UNCAS, a North American Indian, sachem of the Mohegan tribe in Connecticut, died about 1680, at a great age. He was originally a war chief of the Pequot nation, but in 1634 revolted from the Pequot sachem Sassacus, obtained the support of the English settlers, and so acquired dominion over the Mohegan territory. In May, 1637, he joined the English in the war against the Pequots, and proved a valuable auxiliary, receiving for his services another portion of the Pequot lands. Many of the Pequots were shielded by him from the vengeance of the English when the war was over, and for this he was for a time in partial disgrace with the authorities; but he was soon received again into so great favor with the whites that several attempts were made by different Indians to assassinate him. There was then in existence an agreement to refer all quarrels to the English. Uncas accordingly complained to them, and they joined him in a war that ended in the death of the powerful Narraganset sachem Miantonomoh, at whose instigation it was thought the attempts had been made. In 1648 the Mohawks, Pocomtocks, and other tribes made war against Uncas with but little success. He was besieged in 1657 in his stronghold on the Connecticut by the Narraganset chief Pessacus, and nearly starved out; but he was relieved at almost the last moment by Ensign Leffingwell, who took in to him at night a canoe laden with supplies. For this act it is said that Uncas gave to Leffingwell a deed for all the land upon which the town of Norwich now stands, though that chief afterward sold it to a company. A council of commissioners of the united colonies, held at Boston in 1654, heard a great many complaints of the rapacity and injustice of Uncas, and ordered that he "be duly reproved, and seriously informed that the English cannot own or protect him in any unlawful, much less treacherous and outrageous courses." He was characterized in 1674 as "an old and wicked, wilful man, a drunkard, and otherwise very vicious; who hath always been an opposer and underminer of praying to God." He was the ally of the English in all the wars against the Indians during his life, though in King Philip's war he was too old to be of much active service.

UNGUICULATA, and Ungulata, terms originally applied by Ray to mammals, according as they possessed claws or hoofs, though Aristotle, centuries before, had made a similar division of quadrupeds, placing among unguiculates the monkeys, bats, carnivora, and rodents, and among the ungulates the pachyderms, ruminants, and solipeds (horse). Ray placed among unguiculates the camel, elephant, and edentates, as well as those above mentioned; Linnæus followed Ray in his division of quadrupeds. This system has been variously modified by Cuvier, Swainson, Oken, C. L. Bonaparte, and Owen, the last restricting the unguiculates to the monkeys and carnivora, and the ungulates to the omnivora, ruminants, solipeds, and pachyderms. (See Mammalia, vol. xi. p. 125.)

UNICORN, a fabulous animal resembling a horse, with a single horn issuing from the middle of the forehead, well known as the animal which with the lion supports the coat of arms of England. The unicorn of the Bible was undoubtedly the rhinoceros; the sea unicorn is the narwhal. In Smith's "Illustrations of the Zoology of South Africa," under *rhinoceros keitloa*, is an allusion to *ndzoo-dzoo*, probably a species of rhinoceros, described as about the size of a horse, very fleet, strong, and fierce, with a single horn projecting from the forehead, which comes near the usual figures of the unicorn of fable; it is met with near the tropic of Capricorn and in the country to the north of Mozambique. According to Van Zach, there is in N. Africa a ruminant of the antelope family, with a single long and straight horn upon the forehead; this may be the rhinoceros above referred to, or it may be a mutilated or entirely imaginary animal.

UNIOLA, a genus of North American grasses found on the sea coast from Long island, N. Y., to Virginia and southward. They have tough perennial roots, from the creeping rootstocks of which issue tall erect culms, with flat, lanceolate, broad leaves, and broad, many-flowered spikelets of closely appressed flowers. The broad-leaved uniola (*U. latifolia*, Mx.) is an elegant plant with culms 2 to 3 feet high, the spikelets of a pleasing green color, oblong, acute, with 10 to 15 flowers. It is found on fertile hillsides and banks of rivers from southern Pennsylvania to Kansas and southward. It is well suited to the garden, especially if the soil is light and sandy, and easily propagates from seeds or division of its roots. The panicled uniola (*U. paniculata*, Linn.) has stout culms 3 to 5 feet high, very long rigid leaves, becoming soon convolute, crowded, drooping panicles, and is a conspicuous plant, occurring in the drifting sands on the sea coasts from southern Virginia to Florida. The graceful uniola (*U. gracilis*, Mx.) has smaller, contracted, and wand-like panicles, with appressed branches broadly wedge-shaped, and with 4 to 8 flowers, the culms 3 feet in height; it is found on the coast from Long island southward. A species with smooth linear leaves and slender culms, 1 to 2 feet high (*U. nitida*, Baldwin), occurs in swamps of Georgia and Florida; and another species (*U. distichophylla*) is described by Labillardière as indigenous to New Holland. The uniolas possess no agricultural value, but are grasses of extraordinary beauty.

UNION, the name of counties in 13 of the United States. I. A N. E. co. of N. J., bounded N. E. by Passaic river, E. by Staten Island sound and Newark bay, and S. by Rahway river, and drained by Elizabeth river and several small streams; area, 101 sq. m.; pop. in 1860, 27,781. The surface is nearly level, and the soil generally fertile. The productions in 1860 were 10,034 bushels of wheat, 14,693 of rye, 191,980 of Indian corn, 100,507 of oats, 55,225 of potatoes, 230,145 lbs. of butter, and 12,128 tons of hay. There were 44 carriage factories, 11 clothing factories, and altogether 181 manufacturing establishments with a capital of $2,921,789; 50 churches, 6 newspaper offices, and 4,599 pupils attending public schools. It is intersected by the New Jersey and the New Jersey central railroads. It was formed out of part of Essex co. in 1858. Capital, Elizabeth. II. A central co. of Penn., bounded E. by the Susquehanna river and its West branch, and drained by Penn's, Buffalo, White Deer, and Middle creeks; area, about 250 sq. m.; pop. in 1860, 14,145. The surface is mountainous, the Buffalo, Nittany, and other mountains belonging to the Alleghany range traversing a large part of the county; the soil along the streams is very rich. Iron ore, bituminous coal, and limestone abound. There are several iron furnaces and founderies, 2 newspaper offices, and in 1860 there were 3,778 pupils attending public schools. Snyder co. was formed out of the south half of Union in 1855. The North Branch canal passes along the E. border. Capital, New Berlin. III. A S. co. of N. C., bordering W. and S. on S. C., drained by Warsaw and Richardson creeks; area, about 350 sq. m.; pop. in 1860, 11,202, of whom 2,246 were slaves. The surface is generally hilly and the soil in some parts fertile. The productions in 1850 were 59,856 bushels of wheat, 39,875 of Indian corn, and 2,264 bales of cotton. There were 28 churches, and 1,038 pupils attending public schools. Granite and slate abound, and excellent stone for hones and whetstones is found. Gold mines of some value have been worked. Capital, Monroe. IV. A N. district of S. C., bounded E. by Broad river and S. by the Ennoree, and intersected by the Pacolet and Tyger rivers; area, 500 sq. m.; pop. in 1860, 19,635, of whom 10,801 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 655,078 bushels of Indian corn, 68,826 of wheat, 99,739 of oats, 47,127 of sweet potatoes, and 14,156 bales of cotton. There were 25 grist mills, 18 saw mills, 8 tanneries, an iron foundery, 40 churches, and 285 pupils attending public schools. Iron ore and granite abound, and there is one valuable gold mine. It is intersected by the Spartanburg and Union railroad. Capital, Unionville. V. A N. co. of Ga., bordering on N. C., and drained by the head streams of the Hiawassee and Tocoa rivers; area, 680 sq. m.; pop. in 1860, 4,413, of whom 116 were slaves. The surface is mountainous, being traversed by the Blue ridge. The highlands are well adapted to pasturage. The productions in 1850 were 274,345 bushels of Indian corn, 40,428 of oats, and 30,867 of sweet potatoes. There were 2 tanneries, 1 forge, 12 churches, and 275 pupils attending public schools. Iron, marble, and granite are found, and there are profitable gold mines. Capital, Blairsville. VI. A N. parish of La., bordering on Ark., bounded E. by the Washita river and intersected by its affluents the D'Arbonne and Lutre bayous; area, about 1,000 sq. m.; pop. in 1860, 10,390, of whom 3,745 were slaves. The surface is moderately hilly and the soil sandy and fertile. The productions in 1850 were 292,095 bushels of Indian corn, 105,890 of sweet potatoes, and 5,213 bales of cotton. There were 11 churches, and 514 pupils attending public schools. The Washita and D'Arbonne are navigable for steamboats. Capital, Farmersville. VII. A S. co. of Ark., bordering on La., bounded N. W. by the Washita river, and drained by several of its tributaries; area, about 1,230 sq. m.; pop. in 1860, 10,298, of whom 1,331 were slaves. The surface is hilly and the soil fertile. The productions in 1850 were 341,406 bushels of Indian corn, 93,660 of sweet potatoes, 7,087 bales of cotton, and 82,861 lbs. of butter. Capital, El Dorado. VIII. A new N. E. co. of Tenn., intersected by Clinch river, and bounded N. by its N. fork; area, about 400 sq. m.; pop. in 1860, 6,117, of whom 182 were slaves. The surface in the N. and centre is mountainous, and in other parts hilly, and the soil adapted to grazing. Wheat, Indian corn, and tobacco are produced, and iron ore and bituminous coal are found. Capital, Maynardsville. IX. A N. W. co. of Ky., separated from Indiana and Illinois by the Ohio river, and drained by Tradewater and Highland creeks; area, 350 sq. m.; pop. in 1860, 12,791, of whom 3,105 were slaves. The surface is undulating or hilly and the soil fertile. The productions in 1850 were 680,640 bushels of Indian corn, 11,994 of wheat, 50,045 of oats, and 494,784 lbs. of tobacco. There were 18 churches, and 1,284 pupils attending public schools. Bituminous coal is abundant, and there are several sulphur and chalybeate springs. Capital, Morganfield. X. A central co. of Ohio, drained by affluents of the Scioto river; area, 445 sq. m.; pop. in 1860, 16,507. The surface is level and the soil fertile. The productions in 1850 were 624,898 bushels of Indian corn, 26,563 of wheat, 88,274 of oats, 247,407 lbs. of butter, 210,340 of cheese, 62,233 of wool, and 16,969 tons of hay. There were 26 churches, and 3,279 pupils attending public schools. It is intersected by the Bellefontaine, Terre Haute, and St. Louis, and the Springfield, Mt. Vernon, and Pittsburg railroads. Capital, Marysville. XI. A S. E. co. of Ind., bordering on Ohio, drained by the East fork of Whitewater river; area, 168 sq. m.; pop. in 1860, 7,110. The surface is generally undulating and the soil very fertile. The productions in 1850 were 631,515 bushels of Indian corn, 58,862 of wheat, 52,930 of oats, 204,269 lbs. of butter, and 3,665 tons of hay. There were 27 churches, and 1,828 pupils attending public schools. Capital, Liberty. XII. A S. co. of Ill., bounded W. by the Mississippi and drained by Clear creek; area, 320 sq. m.; pop. in 1860, 11,182. The surface is undulating and the soil fertile. The productions in 1850 were 314,705 bushels of Indian corn, 31,902 of wheat, and 42,249 of oats. There were 27 churches, and 1,300 pupils attending public schools. Iron ore, lead, chalk, bituminous coal, porcelain clay, alum, and copperas are found. It is intersected by the Illinois central railroad. Capital, Jonesborough. XIII. A S. W. co. of Iowa, drained by the head waters of the Platte and Grand rivers; area, 432 sq. m.; pop. in 1860, 2,012. The surface is level or undulating, and the soil fertile. The productions in 1859 were 3,498 bushels of wheat, 65,608 of Indian corn, 1,964 tons of hay, and 36,274 lbs. of butter. The line of the projected Burlington and Missouri railroad passes through the county. Capital, Afton.

UNION COLLEGE, a seat of learning at Schenectady, N. Y. In 1779 the inhabitants of the region lying N. of the Mohawk river petitioned the legislature for the incorporation of a college, but without success. In 1782 and in 1791 the petition was renewed, but again failed. In 1793 the Schenectady academy was incorporated. In 1794 an effort was made to obtain an endowment for a college by subscription, and $7,935 was contributed by 99 persons in Albany, and $3,425 by 231 persons in Schenectady. This sum was afterward largely increased by further subscriptions, and through the influence of Gen. Philip Schuyler, who had been a liberal contributor, the location was fixed at Schenectady. On Feb. 25, 1795, the regents of the university incorporated it. It received its name from the coöperation of several religious denominations in its organization. The first president was John Blair Smith, D.D., who on his election resigned the pastorate of the third Presbyterian church in Philadelphia, but in 1799 returned to his former charge, and died a few months later. He was succeeded by Jonathan Edwards the younger, who, at the time of his election in May, 1799, was pastor of a Congregational church in Colebrook, Conn. He died in Aug. 1801, and in 1802 the Rev. Jonathan Maxcy, D.D., then president of Brown university, was chosen to succeed him, but after two years resigned to accept the presidency of the South Carolina college. In 1804 Eliphalet Nott, D.D., then pastor of a Presbyterian church in Albany, was elected to the presidency of the college, and still holds the office (May, 1862). At President Nott's accession the college was but slenderly endowed and had but a small number of students. The college building (there was then only one) was in the city. Application was made to the legislature for aid, and in 1805, and subsequently in 1814 and 1822, lotteries were authorized, the net proceeds of which were to go to the endowment of the college. The fund thus raised, together with some subscriptions and donations, permanently invested, amounted in 1822 to $331,612.13. The proceeds of the last lottery were involved with private property of Dr. Nott, who managed the whole, and in process of time the accounts had become so much complicated, that it required many months and the skill of eminent accountants to ascertain the rights of the two parties. These having been determined, Dr. Nott, by papers executed Dec. 28, 1855, made over to trustees for the college a large sum, estimated at several hundred thousand dollars. The building first erected in Schenectady proving inadequate for the wants of the college, a tract of land was purchased in 1814 on an eminence E. of the city, and two buildings were erected. To these have since been added buildings for library, cabinet, and lecture rooms, and a fine central chapel, begun in 1858. The building in the city was sold to the municipal authorities for the use of the public schools. In 1855 the college was partially reorganized, and departments of civil engineering and analytical chemistry established, which are amply provided with facilities for instruction. Mr. E. C. Delavan has presented to the college a fine cabinet of minerals and shells, known as the "Wheatley collection," purchased for the institution at a cost of $10,000. The faculty now consists of the president, vice-president, 12 professors, 1 lecturer, and 3 tutors. There are about 320 students. The whole number of alumni in 1860 was 3,657, of whom 1,800 were clergymen; and the number of volumes in the college libraries was about 16,000.

UNITARIANISM, the general name since the reformation for that class of opinions which grew up in opposition to the doctrine of the Trinity, rejecting the threefold distinction of personality in the Divine Being, and asserting the absolute unity of God. These opinions appeared simultaneously with the earliest speculations on the Logos, and, though uniformly pronounced heretical by the church, kept even pace with those speculations through all the successive periods of its history. Toward the end of the 2d century we find them associated with the names of Theodotus, a Byzantine leather-dresser, who came to Rome and gathered there a small company of disciples, and Artemon, who also taught in Rome, and whose school maintained for about 100 years its attitude of sharp rationalistic antagonism to the church dogma. Both of these men asserted the simple humanity of Christ, contending that he was no more than a divinely illuminated prophet. Theodotus was excommunicated, not probably for his opinions alone, which Artemon insisted were the current opinions till after his day. Substantially the same views were held about the same time by Beryllus, bishop of Bostra in Arabia. He found an opponent in Origen, and was, it is said, induced to retract his doctrine. Nearly contemporaneous with Theodotus and Artemon, Praxeas came to Rome from Asia Minor and taught under a new form the indivisible unity of the Godhead. The school of Artemon represented Christ as man in the similitude of God; Praxeas represented him as God in the similitude of man, the humanity being only a mask. His fame as a brave confessor shielded Praxeas from suspicion, and gave considerable currency to his views until Tertullian brought down upon them his fiery polemics. In connection with Praxeas, as holding essentially the same opinions of Christ, the name of Noëtus is recorded as teaching in Smyrna. In him we have the germs of the doctrine afterward developed by Sabellius in the middle of the 3d century, a doctrine which saved the divinity of the Son by destroying not only his humanity, but his personality as a member of the Trinity. Arianism (see ARIUS) originated in the 4th century, in a private discussion between Arius, a presbyter of Alexandria, and the bishop Alexander, the latter maintaining the essential equality of the Son and the Father, and the former throwing on the bishop the reproach of Sabellianism, and asserting that there was a time when the Son was not—thus denying the Son's eternity, making his generation dependent on the will of God, and assigning to him a position subordinate to the Supreme, though solitary and unapproachable by any other created being. This doctrine became the parent of the later Socinianism, and through that the direct progenitor of the Unitariansm of a still later day.—At the time of the reformation Unitarianism was one of the earliest developed forms of religious opinion. In Germany Ludwig Hetzer and Johann Denck promulgated it in a rationalistic form, associating the belief that Christ was an illuminated teacher and a perfect human example, with the doctrine of the inner light, and the persuasion that all spirits, even those of devils, would at last be brought into blessedness. In Swabia, Sebastian Frank the mystic appealed to the interior Word which judged the letter of Scripture, and to the interior Christ of whom the historical Christ was only the symbol and sign. Through Switzerland, Claudius of Savoy taught the Hebrew monotheism and the simple humanity of Jesus. In the 16th century Unitarian doctrines of a radical stamp were openly and freely disseminated in Saxony and Holland, in connection generally with Anabaptist opinions. In Italy, long before the reformation, there existed an indefinite amount of dissent from the orthodox Trinitarian faith. The reformation brought the heresies to light only to show how extensive they were, and to occasion their immediate expulsion from the country. Fugitive Unitarians in considerable numbers found refuge in Switzerland. Hither came from Venice Lælius Socinus, who settled in Zürich about 4 years before the burning of Servetus in Geneva. At that date he was travelling in Italy, but on his return he occupied himself with theological speculations, his caution and probably the indistinctness of his views saving him from persecution, though not from suspicion, on the part of Calvin and other leaders of the Trinitarian party. At Zürich Bernardino Ochino, an intimate associate of Socinus, published in 1563 the dialogues in which the doctrine of the Trinity, and indeed every other cardinal doctrine, was submitted to severe examination. Matteo Gribaldi and Giorgio Blandrata of Saluzzo taught in and about Geneva that the Father and the Son were two distinct persons, the first divine in essence, the second having a derived divinity. Calvin was obliged to use his authority to stop the increasing heresy. Blandrata withdrew to Zürich; other teachers left Switzerland for Poland. A few years later Giovanni Valentino Gentilis, a Calabrian, was beheaded at Bern for false doctrine and blasphemy, his opinions being similar to those which the Spaniard Servetus had disseminated so widely through Switzerland, Germany, and France. Poland was now the refuge of the Unitarian believers. A printing establishment at Racow issued writings of Faustus Socinus about the middle of the 16th century. The nobility, a powerful, rich, and independent class, all but sovereign on their own estates, encouraged the principles of the reformation in their most radical form. The exiles from Italy and Switzerland made Pinczow their head-quarters, and were known as Pinczovians. For 10 years they freely pursued their inquiries within the pale of the reformed church. Gonesius wrote boldly against the Trinity. Blandrata would use none but

Scripture language in speaking of God and Christ. Stancar taught that Christ mediated as man only. Gregory Pauli openly denied his preëxistence. Statorius contended that the Holy Ghost was the power of God's grace in the soul. The Unitarians were called *ecclesia minor;* but they were hardly more than an unorganized band of dissenters till F. Socinus came among them and elaborated the system which has since borne his name. Socinus spent several years in Cracow, and left it only when residence there became insecure. With Sigismund III. the dark days of Unitarianism came in. The Jesuits were recalled to the kingdom; the offices of dignity and emolument were given to the Roman Catholics; the populace was instigated to acts of violence against dissenters; and Socinus narrowly escaped death at the hands of a mob. In 1627 the church in Lublin was broken up; in 1638 a decree was passed devoting to destruction the famous school at Racow, which, under the patronage of Socinian nobles, had been called the Athens of Sarmatia. The outcasts from Racow fled to Kisscelin; but that place was also doomed. From the colloquy of Thorn the Unitarians alone were excluded. A decree of John Casimir forbade the profession of Arianism on pain of death. Under the pressure of this decree, which was to take effect at the expiration of two years, some of the Unitarians abandoned their faith, and others abandoned their country and went to Transylvania, Germany, Silesia, Prussia, and the Netherlands. Pursued by authority, hated by the people for their opinions, divided among themselves, they dragged on a painful existence till the end of the century, and then as a body disappeared from all other countries of Europe but Transylvania.—In the English mind Unitarian opinions took root at a very early period of the reformation. In the reign of Edward VI., George Van Paris was burned at Smithfield for denying the proper divinity of Christ. Francis Wright was burned at Norwich in 1588 for similar opinions. The fires were lighted again in Smithfield 24 years later to burn Arianism in the body of Bartholomew Legate. The same year (1612) Edward Wightman suffered at the stake in Lichfield for the rather inconsistent heresies of Ebionitism and Arianism, his judges probably not understanding the distinction, but deeming either fair cause for burning. Among the humbler classes many denied the Godhead of Christ, some asserting his simple humanity, others claiming for him an angelic nature. At a later period, encouraged by the free thought of the age and by foreign influences, chiefly from Holland, the doctrines of the continental Anti-Trinitarians prevailed extensively. The synods of London and York found Socinianism formidable enough in 1640 for the direction of a special canon against it. The poet Suckling allotted to it a separate chapter in his "Account of Religion by Reason." Under the long parliament the doctrine was openly preached in London that Christ was not God. Nye told some divines of the assembly that "to his knowledge the denying of the divinity of Christ was a growing opinion;" and Dr. Owen in 1655 wrote: "There is not a city, a town, scarce a village in England wherein some of this poison is not poured forth." In April, 1652, copies of the Racovian catechism were burned in London, an indication of the connection between Polish Socinianism and English Unitarianism. The first apostle of Unitarianism in England was John Biddle, of Magdalen hall, Oxford. He gathered a congregation in London, published two catechisms setting forth a rude and crude scriptural theology, and is said to have translated the Racovian catechism into English. Biddle had great scorn for "the brain-sick notions which were first hatched in the brains of Platonists to pervert the worship of the true God," and was zealous in opposing them to a degree that brought on him serious persecution. The council of state directed Dr. Owen to refute Biddle's views. Socinian opinions were very prevalent in the church, even more than out of it, some said. In 1705 we hear of "troops of Unitarian and Socinian writers, and not one dissenter found among them." Thomas Firmin, a most earnest Unitarian, disseminated his doctrines within the establishment. Milton's Unitarianism seems not to have been suspected in his time. A Calvinistic member of the church of England admitted that a large body of the clergy were lapsing into Socinianism. The great debate on the Trinity which engaged the religious world during the last 10 years of the 17th century, in which South and Sherlock took so conspicuous a part, was raised by Unitarians, who were numerous and able enough to draw attention to their opinions, though their publications bore no name of author, publisher, or printer. Before the close of the century they had their own places of worship in London. The writings of Locke favored indirectly the progress of Unitarian views. Locke himself disavowed the name of Socinian; but Edwards, in his "Socinianism Unmasked," made a direct attack on his "Reasonableness of Christianity." The publication of Hartley's "Observations on Man" gave rise to a new school, of which Joseph Priestley was the head. It was founded on the principles of the sensational philosophy, accepted religious truths on the evidence of miracle, and limited the number of those truths to the cardinal doctrines, the unity of God, and the general resurrection. Their opinions gained ground but slowly. Of this stamp was the Unitarianism that first made its appearance in America by the middle of the last century. Emlyn's "Inquiry into the Scripture Account of Jesus Christ" was republished in Boston in 1756, and extensively circulated; and the general tone of thought in Boston was decidedly Unitarian 30 years later. A Unitarian was made professor of divinity at Cambridge in 1805. Ten years later, the republication in Boston of Belsham's chapter on the "Progress and Present State of the Unitarian Churches in America," in his "Memoir of Lindsey," brought on the controversy between Dr. Channing and Dr. Worcester which resulted in a separation of the Unitarians from the "Orthodox," and the establishment of a sect. But American Unitarianism was to no considerable extent an echo of English thought. Channing exerted a powerful influence on American and even on English Unitarianism, and gave them a new direction, partly by withdrawing interest from points of controversial divinity, partly by subordinating theories and religion to the religious life, but more by bringing into light the spiritual elements of human nature, and thus initiating the practice of trying religious systems by the instincts and sentiments of the soul. To Channing Unitarianism owes much of its freedom from sectarian and dogmatic trammels. The writings of Lessing, Eichhorn, Herder, Schleiermacher, De Wette, and Strauss, the transcendental philosophy, the historical criticism, were all welcomed and studied by the successors of Channing, and all contributed largely to the formation of a new school of thought, which was adopted with most enthusiasm by Unitarians, and was represented in England by James Martineau, and in the United States by Theodore Parker.—The creed of Unitarians is not easily defined, for the reason that they disavow all right to frame or impose authoritative statements of opinion. Socinianism was a clear and coherent scheme of theological doctrine; but Socinianism was never identical with Unitarianism; the early English Unitarians took pains to signify their dissent from the system of Socinus, and at present very few Unitarians are Socinians. On one point only Unitarians have been always agreed, viz., the subordination of Christ. But respecting the degree of the subordination, and the extent to which other doctrines of Christendom have been affected by it, there has been no agreement. There are Unitarians who accept the Trinity in a philosophical sense, while rejecting the deity of Christ; and there are those not Unitarians who accept the deity of Christ, but reject the Trinity. Some Unitarians have held that Christ was an angelic being, from the beginning associated with the Father, and through him creating the world. Others have conceived him as a human being, miraculously endowed and supernaturally qualified to bring a revelation of truth. Others again have regarded him as a simple man of wonderful spiritual gifts, by which he obtained an extraordinary but natural mastery over souls and bodies, and through which he organized a society called the church. Some have asserted and some have denied his preëxistence; some have admitted and some have rejected his miraculous birth; some have doubted, while others have laid stress on his miraculous history; with some he has been an inspired prophet, with others an ideal man, with others a perfect example of moral excellence, and with a few the type of a new order of human beings, the inaugurator of a new social state. Some, while refusing to ascribe to him omnipotence, omniscience, or omnipresence, have claimed for him infallibility, impeccability, and a perfectly righteous will; others have contended that his whole nature was confined within human limitations. One class speak of Christ as saviour, mediator, intercessor, and final judge; another class drop all these appellations, and know him only as teacher, quickener, and guide. Here he is venerated as Lord; there he is loved as brother. The Polish Unitarians debated the point of offering divine honors to Christ. Socinus, though refusing to accept the preëxistence, refused the Christian name to such as would not pray to Jesus. There have been Unitarians who taught that the Holy Spirit was a person; but now, so far as we know, all agree in considering it an influence.—The rejection of the dogma of the deity of Christ has brought with it the rejection, in more or less absolute form, of other characteristic dogmas in the creed of Christendom. The doctrine of total depravity and moral inability was among the first to fall. All Unitarians contend for man's power to receive moral illumination; most claim a freedom of choice between good and evil, and the natural power to obey the right. A few accept the doctrine of a fall, but hold that its consequences were never destructive of the innate rectitude of human nature, or of the law written on the heart; a few reject the doctrine of hereditary and transmitted qualities, and maintain that the soul of each new-born child is like a sheet of white paper unpledged to good or evil; some others recognize the law of transmission, but contend that man, instead of beginning his career as a perfect being, began at the lowest point of imperfection, and has since been making progress toward his full development in mind and character. With the dogma of depravity fell that of the infinite sacrifice, a vicarious atonement being unnecessary, since man is supposed to be in possession of his own moral and spiritual powers; and impossible, since the Christ has lost the rank necessary to render his sacrifice adequate to the great end. The Unitarian view of the atonement depends of course on the view of Christ and of human nature, and so belief ranges all the way from a modified conception of a Saviour's redeeming office to the opinion that his whole function was discharged in his office of teacher and exemplar.—The first phase of Unitarianism in any country may be most fitly described as Anti-Trinitarianism; the next, a fuller statement of the simple positive doctrine, the unity of God. At first the divine unity was conceived numerically, as unitheism, in opposition to tritheism and polytheism; the God was a being of undivided metaphysical personality, of a single consciousness. He was the one God of the Hebrews, an individual being who dwelt external to his works, ruled them from without, and communicated with them by miracle. But gradually a different idea was entertained. Especially the moral unity of God was emphasized—the perfect harmony of the divine attributes, the perfect consistency of the divine purposes, the absolute dominion of the divine goodness. God was known and spoken of as Father, the paternal relation summing up and absorbing every other. By pursuing this idea of the divine paternity, the belief was arrived at that no power of pure malignity had an existence in the universe; that there was no personal Satan; that evil was no absolute entity, limiting, marring, or thwarting the beneficent energies of the Supreme; that the whole universe was dispossessed of demons, and belonged without reservation to the All-Good. Having reached this point, and expelled Satan from the world this side the grave, it was impossible not to go further and expel him from the region which lay on the other. Unitarianism has therefore earnestly contended against the doctrine of everlasting punishment of the wicked. While it holds no fixed or consentaneous opinion in regard to the state of being in another life, it has asserted that the state of being could not in any case be one of hopeless misery. There might be suffering, severe in degree and indefinite in duration; but it would be disciplinary, not vindictive in its purpose, and it would cease when its beneficent end was secured. Unitarians have insisted very strongly on the doctrine of retribution, but its object was never supposed to be the infliction of suffering for its own sake, or to satisfy merely the moral law; many have contended that the pain was but the necessary consequence or the inevitable concomitant of sin, enduring as long as that endured, and no longer; but the prevalent theory is probably that of the progressionists, who hold that the next life is the continuation of this, and that the soul under new conditions carries forward to its completion the process of spiritual development begun here.—The same general modification of view that characterizes the Unitarian thought in the particulars already mentioned, may be observed in the opinions respecting the Bible. The Polish Unitarians mostly held fast to the inspiration of the Scriptures, and appealed to them as final authority in all points of religious belief. The early English Unitarians did the same. The "new school" (if we may use the phrase for the sake of distinctness) do not appeal to the Scriptures as inspired and infallible oracles, but discuss religious questions on grounds of philosophy alone. Regarding the Bible as the most interesting and valuable part of the world's literature, they seek in it illustration of the spiritual laws, but not final statements of moral and religious truth.—In regard to church government, it is enough to say that the congregational form is the prevalent, perhaps the only one. Each society manages its own affairs, temporal and spititual, in its own way. Councils are seldom called, and when called they can pass no decree. Strictly speaking, Unitarianism has no established ritualism, no priestly order, no indispensable, saving sacraments. From the beginning until now the prevailing view of the Lord's supper has been that of Zwingli; and though here and there it has been taught that the communicant partook spiritually of the body of Christ, or received a special grace from the elements, these instances have not been numerrous enough to qualify the assertion that the "communion" is observed in the Unitarian churches as a memorial rite dear to the affections and sacred by association, but carrying with it no special efficacy, demanding in its participant no special holiness, and useful only as a means of cultivating the religious life. In several societies of the "new school" it has been dispensed with altogether. Greater diversity of opinion has obtained respecting baptism than respecting communion. The early Unitarians on the continent and in England opposed infant baptism, but advocated strenuously the baptism of adults. Socinus thought it of little consequence whether one were baptized or not. There are those to-day who think it of considerable moment that children should be baptized; others deem it of no moment whatever. For the most part, when observed, it is made a social household ceremony, and is cherished for the pleasing sentiment that is associated with it.—The worship in Unitarian assemblies is very simple. In 1785 the society worshipping in King's chapel, Boston, eliminated Trinitarianism from the "Book of Common Prayer," and retained the book in its altered form. In other places, societies have compiled books of worship for themselves. In most there is no book. Efforts have been made recently to render the public worship attractive by a "vesper service" of a musical and devotional character. In some portions of the denomination an ecclesiastical spirit has shown itself working to reanimate the body of the church by restoring the declining interest in the institutions and ceremonies.—The progress and spread of Unitarianism has never been rapid, and such advance as it has made has been due more to the general movement of society than to its own conscious efforts. There is little recognized Unitarianism on the continent of Europe. Most of the Protestant ministers in Holland and Germany, it is believed, hold Unitarian opinions. In Paris these opinions are supported by government like other forms of faith, and one of the most eloquent preachers there, Athanase Coquerel, has for years proclaimed the Anti-Trinitarian doctrines. Recently, the writings of Channing have excited interest in Paris. In Great Britain there are about 313 congregations, of which England has 235 with 226 ministers, Scotland 6 with 5 ministers, Ireland 42, and South Wales 30. The Unitarians have 5 periodicals. Missionary operations are conducted through the British and foreign Unitarian association. The

English Unitarians have been largely interested in philanthropic undertakings. They early established the domestic mission in London; and at present they have 10 laborers at work in London, Birmingham, Bristol, Manchester, Liverpool, and Halifax. Unitarianism in America had its birth and still has its head-quarters in Boston. If it goes to other parts of the country, it goes with New Englanders. There are in the United States about 263 societies, of which Massachusetts has 164, and the city of Boston 21; Maine has 16, New Hampshire 15, Vermont 3, Rhode Island 3, Connecticut 2, New York 18, New Jersey 1, Pennsylvania 5, Maryland 2, Ohio 5, Illinois 11, Wisconsin 2, and Missouri, Kentucky, Minnesota, South Carolina, Louisiana, California, and the district of Columbia, each 1. There are about 339 ministers. The "Christians" of the West, a very numerous body, are Unitarian in theology; so for the most part are the Universalists. The divinity school at Cambridge, Mass., is Unitarian, and so is the Meadville (Penn.) theological school. The periodicals published by the denomination are 8 in number. The American Unitarian association commenced its existence in May, 1825. Its purpose was to effect "more systematic union and a concentration of labors by which interest may be awakened, confidence inspired, and efficiency produced." On the same day, without concert, a similar association was formed in England, bearing the title of the British and foreign Unitarian association. In the first year the American association received less than $1,300; now it receives annually from $12,000 to $13,000. It has assisted nearly 100 churches which required foreign aid; issued 277 tracts, in editions varying from 2,000 to 8,000 copies, making a total of 1,764,000, beside reports and miscellaneous tracts; distributed 1,100 sets of Dr. Channing's works, and 1,500 copies of Dr. Peabody's "Doctrinal Lectures;" expended in 8 years for the purchase, printing, and publication of books, $43,090; employed as many as 20 home missionaries; and for several years supported a missionary in India. Closely affiliated with the association is the "Christian Book and Pamphlet Society," established by young men in 1827, which in the past 9 years has circulated gratuitously over 83,000 pamphlets and 4,500 books. The missionary and charitable societies in Boston under Unitarian support or patronage are too numerous to be particularly mentioned here.

UNITAS FRATRUM. See Moravians.

UNITED BRETHREN IN CHRIST, a Protestant church, having no ecclesiastical connection with the Moravians, with whom they are frequently confounded. They arose among the Germans in Pennsylvania about 1760. In 1752 Philip William Otterbein, a missionary of the German Reformed church, sent out to America by the synod of Holland, began to preach in Lancaster, Penn., but soon becoming convinced that he was not himself a converted man, rested not until he experienced what he regarded as the new birth. This new experience led him to institute meetings during the week for prayer and religious conference. The interest excited by these proceedings, and the spiritual destitution of the country, induced him to hold, in barns and groves in various places outside of his pastoral charge, what were called "great meetings." To one of these, held at Isaac Long's, in Lancaster co., all persons who had experienced a change of heart, without respect to their ecclesiastical relations, were especially invited. A large assembly, in which Lutherans, Reformed, Mennonites, Dunkers, Amish, and Moravians were represented, convened; and among the number was found Martin Boehm, a Mennonite preacher, who had also some time before obtained what he deemed the new life. At the conclusion of a remarkably effective sermon by Boehm, Otterbein arose, and, embracing him, exclaimed: "We are brethren!" This was the origin of the name of the new church. Otterbein and Boehm labored together for more than 50 years; and as the calls for preaching became numerous, laymen selected from the converts were licensed to preach. These laborers at first held conferences at the great meetings; but when this became impracticable, annual conferences were appointed, where preachers were licensed, examined, disciplined, and directed in their labors. In 1859 the church had 29 annual conferences; 1,150 ministers, 700 of whom were itinerant; 336 circuits; 25 stations; 224 missions, 63 of which were established in 1858–'9; 4,507 preaching places; 880 meeting houses; 3,199 classes; and 84,000 members. It has at Dayton, Ohio, an extensive printing establishment, where several periodicals and a variety of books are issued, in English and German. It owns 7 institutions of learning, viz.: Otterbein university, Ohio; Hartsville university, Ind.; Michigan collegiate institute, Mich.; Western college, Iowa; Blandinsville seminary, Ill.; Fremont seminary, Kansas; and Sublimity college, Oregon. The United Brethren in Christ have but one grade of ministers, are Arminian in theology, and supply their churches with preaching on the itinerant plan. They have quarterly, annual, and general conferences. The highest ecclesiastical body is the general conference, which meets every 4 years, and is composed of delegates from the conference districts elected by ballot, every member of the church being entitled to vote. No slaveholder, no adhering member of any secret combination, and no manufacturer, seller, or drinker of intoxicating liquors can be a member of the church. They regard a change of heart as an indispensable condition of membership. Baptism is administered by either sprinkling, pouring, or immersion, each member being permitted to exercise his own judgment in regard to the mode; infants are baptized when it is desired. Open communion at the Lord's table is practised. Until about 1825 the United Brethren in Christ confined their labors almost exclusively to persons speaking the German language; but at present by far the greater number of the communicants speak English. They have churches in the eastern, middle, southern, and western states, in most of the territories, and in Canada. In some of the western states this church is among the largest denominations.—See "History of the United Brethren in Christ," by G. Lawrence.

UNITED EVANGELICAL CHURCH, an ecclesiastical denomination in Germany, which arose in 1817 out of a union of the Lutheran and Reformed churches. Attempts at uniting these two churches were made as early as 1529, when leading theologians of both schools held a conference at Marburg. Though fruitless, these attempts were often renewed, and other religious conferences between theologians of the two denominations were held at Leipsic in 1631, and at Cassel in 1661. In 1703 Frederic I. of Prussia convened several Lutheran and Reformed theologians at Berlin, to discuss the practicability of a union. He erected union churches at Berlin and Charlottenburg, and had the orphans of the two denominations brought up in the same establishments; but the Lutheran clergy made a successful resistance to the progress of these schemes. A "Plan of Union" proposed by Klemm and Pfaff, theologians of Tübingen from 1710 to 1722, met with little favor. Frederic's successor, Frederic William I., issued several decrees designed to promote a union. The rise of rationalism, toward the close of the 18th century, disposed the theologians generally in favor of a union of the two churches, whose distinctive tenets, it was generally admitted, had but few believers among the clergy of either. Schleiermacher proposed to establish at first only an external church unity, and to leave the controversies of scientific theology open to discussion. The tercentenary of the reformation in 1817 led at length to the practical establishment of the union, which, however, in the opinion of many of its advocates, was to consist at first only in the establishment of a common church government and the common celebration of the Lord's supper. The leadership in this movement was assumed and has ever since been maintained by the government of Prussia. The clergy of Berlin issued a declaration in favor of the union, and a circular of the minister of the interior confirmed it, and decreed that the united church should bear henceforth the name Evangelical Christian church. It was thought that the union would be gradually and peaceably consummated by an agreement respecting a constitution, church property, and ordinary usages. It was also decided that the Lord's supper should be celebrated by a mere breaking of the bread and a faithful recitation of the words used in the original institution. For several years this work appeared to be in process of accomplishment in the several ecclesiastical corporations, sometimes by public enactments and sometimes as the government directed, by a practical acceptance of the breaking of the bread and an acknowledgment of the authorities of the united church; but it was considerably disturbed by the introduction of a new liturgical book, the *Agenda*. A theological commission, appointed to compose such an instrument, accomplished nothing. The king then published an *Agenda*, which had been introduced by his cabinet (1822) into the court church, gave orders that it should be introduced into the garrison churches of his kingdom, and recommended it to all the congregations of the realm, instead of the conflicting and arbitrary forms which had previously been used in the different provinces. Many objections were raised against the *Agenda*, especially by the strict Lutherans; and when in 1834 a royal decree was issued ordering its introduction into all non-united as well as united congregations of the kingdom, a number of strict Lutherans seceded from the national church. For several years the government endeavored by the suspension of ministers to coerce them back into the national church; but in 1845 Frederic William IV. conceded liberty of worship. They then organized an independent Lutheran church, which numbered in 1861 about 60,000 members. All the rest of the former Lutheran and Reformed churches of Prussia, embracing about 10,000,000 souls, are nominally connected with the United Evangelical church. There is great difference of opinion, however, as to the nature and extent of the union by which the United Evangelical church has been called into existence. One party—generally called the confederalists—under the leadership of Prof. Hengstenberg and the late Dr. Stahl, maintain that the union consists in a mere external confederation and subjection to the same general church government; that the individual churches remain Lutheran, Reformed, or (if they have expressly adopted the union) United; and that if the right of adhering to the old standards of the Lutheran confession should be curtailed, it would become the duty of the party to secede. A second party, commonly called the consensus party, takes for its doctrinal basis the Bible and the common dogmas of the Lutheran and Reformed confessions. It controls the theological faculties of most of the universities, not only in Prussia, but in the other German states. Among its leading men are Nitzsch, Twesten, Hoffmann, Niedner, Tholuck, Julius Müller, Jacobi, Dorner, Lange, Liebner, Stier, Ullmann, Umbreit, Ebrard, Herzog, and Rothe. A third party, frequently designated as the union party, reject the authoritative character of the old symbolical books of both the Lutheran and the Reformed denominations, and base themselves on the Bible simply, claiming at the same time the right of subjecting the authenticity of the Old and New Testaments to critical examination. This party embraces many of the disciples of Schleiermacher, the school of Tübingen, and a number of liberal divines of different shades of opinion. The second and third parties agreed in asking for the introduction of a presbyterian church constitution, embracing district, provincial, and general synods; but their exertions were vigorously resisted by the confederalists. Frederic William IV., who repeatedly declared his wish to restore full self-government to the national church, convoked in 1846 a general synod, in order to complete her organization. The work was interrupted by the revolution of 1848, but resumed in 1856 by another general conference, and began to be carried out upon the accession to the government of the regent, now King William I., in 1858.—The example of the king of Prussia in consolidating the Lutheran and Reformed churches into a United Evangelical church was followed in a number of other German states. Thus the union was introduced, either by resolution of synods or by a general vote, in Nassau (1817), the Bavarian Palatinate (1818), Baden (1821), and even in Würtemberg (1827), where the Reformed church had hardly an existence. The union may be considered permanently established in the Bavarian Palatinate and in Baden, in both of which the church has a presbyterian constitution, inclusive of a general synod, which in both churches is unanimous in maintaining the union. In the other state churches, in which the consistorial element still prevails over the synodal, the views of the churches and congregations on the subject have never been fully ascertained, and their final relation to the United Evangelical church can be determined only after a completion of their ecclesiastical constitution. Saxony, Hanover, Bavaria proper, Mecklenburg, Brunswick, and several other states were too exclusively Lutheran, Switzerland too exclusively Reformed, to fall in with the movement. In Austria and France a fusion of the Lutheran and Reformed churches has also many friends, but nothing has been done as yet in the way of practical execution. In the United States there is a branch of the United Evangelical church of Germany, called *Evangelischer Kirchenverein des Westens*, founded at St. Louis in 1841.—See Hering, *Geschichte der kirchlichen Unionsversuche* (2 vols., Leipsic, 1836–'8); Nitzsch, *Urkundenbuch der Evangelischen Union* (Bonn, 1853); Julius Müller, *Die Evangelische Union* (Leipsic, 1854); Stahl, *Die Lutherische Kirche und die Union* (Berlin, 1858).

UNITED PROVINCES. See NETHERLANDS.

UNITED STATES OF AMERICA, THE, a republic in North America, lying between lat. 24° 30′ and 49° N. and between long. 66° 50′ and 124° 30′ W. It is bounded N. by British America, from which it is in part separated by the river St. Lawrence and Lakes Superior, Huron, St. Clair, Erie, and Ontario; E. by the Atlantic ocean; S. by Mexico and the gulf of Mexico; and W. by the Pacific ocean. The greatest length of this vast region is from Cape Cod on the Atlantic to the Pacific, near the parallel of lat. 42°, about 2,600 m., and the greatest breadth from Madawaska in Maine to Key West in Florida, about 1,600 m., the mean length being about 2,400 m. and the mean breadth about 1,300 m. The line of the frontier toward British America measures 3,303 m., and that toward Mexico 1,456 m. The boundary line on the ocean, including the larger indentations, is 12,609 m., of which 6,861 m. are on the Atlantic, 3,467 m. on the gulf of Mexico, and 2,281 m. on the Pacific. With the exception of a small portion of the N. E. coast, the shores on the Atlantic and gulf are low, while those on the Pacific are mostly bold and rocky. The most important indentations are Passamaquoddy, Frenchman's, Penobscot, Casco, Massachusetts, Buzzard's, New York, Raritan, Delaware, and Chesapeake bays, and Long Island, Albemarle, and Pamlico sounds on the Atlantic; Tampa, Appalachee, Appalachicola, Pensacola, Mobile, Black, Barataria, Atchafalaya, Vermilion, Galveston, Matagorda, Aransas, and Corpus Christi bays on the gulf; and San Francisco bay and the straits of Juan de Fuca on the Pacific. Politically the republic is divided into 34 states, 8 territories (including Arizona, not yet organized), and the federal district of Columbia. For convenience the states are generally classified by geographers as follows: eastern or New England states, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut; middle states, New York, New Jersey, Pennsylvania, Delaware; southern states, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas; western states, Arkansas, Tennessee, Kentucky, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, California, Oregon. The southern and western states are sometimes also subdivided as follows: southern, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida; south-western, Alabama, Mississippi, Louisiana, Texas, Arkansas, Tennessee; north-western, Kentucky, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, California, Oregon. The date of admission of the states into the Union and of the organization of the territories, their area, and their population according to the successive decennial censuses, are shown in tables I., II., and III. The areas are derived in some instances from the result of state surveys. The total area of the states and territories, according to the report of the topographical bureau made at the close of 1858, and subsequently revised and amended, is 2,968,666 sq. m., of which 820,680 sq. m. belonged to the republic at the peace of 1783; about 889,579 sq. m. were added by the purchase of Louisiana, 66,900 by the acquisition of Florida, 318,000 by the annexation of Texas, 308,052 by the Oregon treaty, and 550,455 by the Mexican treaties. Mr. Kennedy, superintendent of the census bureau, estimates the total area at

3,230,572 sq. m. The commissioner of the general land office in 1860 estimated the land area of the states and territories at 2,943,257 sq. m. or 1,883,744,000 acres; or including the Indian territory, 3,010,277 sq. m. or 1,926,636,800 acres. The population of the 13 colonies at the breaking out of the war of the revolution in 1775 was 2,803,000, including about 500,000 slaves. Table IV. gives the number of deaf and dumb, blind, and insane persons in the United States in 1850 and 1860; table V., the increase per cent. of the population of each state and territory during the 10 years next preceding each decennial census; table VI., the nativities of the white and free colored population in 1850; table VII., the capitals of the states and territories, their population to the square mile, the valuation of real and personal estate, and the number of representatives of each state in congress under the censuses of 1850 and 1860; and table VIII., the population of all the cities and towns of the United States having over 12,000 inhabitants in 1860. The uncivilized Indians are not included in the census returns, and the Indian territory, not forming a component part of the republic, though belonging to it, is not counted in estimating the area. It has an area of 74,127 sq. m. In 1789 the number of Indians within the territory of the United States was 76,000. By the acquisition of new territory this number was raised to 129,366 in 1825, exclusive of those in the Missouri valley; and to 400,764 in 1853, though all the tribes have been rapidly diminishing. The numbers reported in 1853 were distributed, as nearly as can be ascertained, as follows: in the Indian territory, 91,428; New York, 3,745; North Carolina, 1,600; South Carolina, 200; Florida, 500; Alabama, 100; Mississippi, 1,000; Texas, 29,000; Wisconsin and Minnesota, 29,786; California, 100,000; Oregon and Washington territory, 23,000; Utah, 11,500; New Mexico, 45,000; Missouri valley (Blackfeet, Sioux, and other tribes), 43,430; the plains, or Arkansas river (Kioways, Comanches, Pawnees, &c.), 20,000. In Dec. 1861, the government held relations with 152 tribes, comprising 239,506 persons, of whom $\frac{7}{12}$ were females.—The rivers of the United States, exclusive of the St. Lawrence, which washes a portion of the northern frontier, may be comprised in four distinct classes. 1. The Mississippi and its affluents, which drain the entire region between the Alleghanies and the Rocky mountains. The chief of these affluents are, on the E., the Wisconsin, Illinois, Ohio, and Yazoo; and on the W., the Minnesota, Des Moines, Missouri, Arkansas, and Red river. Several of these rivers are streams of the first class, from 1,000 to 2,000 m. in length, while many of the secondary affluents have courses extending from 800 to 1,000 m. 2. The rivers which rise in the Alleghany chain and flow into the Atlantic. Of these, the most important, beginning at the N. E., are the Penobscot, Kennebec, Connecticut, Hudson, Delaware, Susquehanna, Potomac, James, Chowan, Roanoke, Pamlico or Tar river, Neuse, Cape Fear, Great Pedee, Santee, Savannah, and Altamaha, all of which exceed 300 m. in length, and are navigable to a considerable distance from the sea. 3. The rivers of the southern slope, flowing into the gulf of Mexico, the principal of which, E. of the Mississippi, are the Appalachicola and the Mobile, and their affluents, and W. of the Mississippi, the Sabine, Trinity, Brazos, Colorado, and Rio Grande. 4. The rivers which flow into the Pacific, of which the most important are the Columbia, which has several large affluents; the Sacramento and the San Joaquin, which flow into the bay of San Francisco; and the great Colorado of the West, which has its terminus in the gulf of California. Few countries in the world contain so many lakes as the United States, though these are principally confined to the northern portion. Of the five great lakes, as they are called, the largest bodies of fresh water on the globe, with perhaps the exception of the newly discovered and imperfectly known lakes in the interior of Africa, four, viz., Superior, Huron, Erie, and Ontario, lie on the northern border, partly in the United States and partly in British America, while Michigan is wholly within the territory of the republic. So is nearly all of Champlain, another lake of great length, though far inferior in breadth to the five great lakes. Near the southern end of Lake Champlain, in New York, is Lake George, renowned for its beautiful scenery, a feature equally characteristic of a number of other lakes in the neighboring wilderness of the Adirondac, and of others in New England. Among the last mentioned, the most important are Moosehead in Maine, Winnipiseogee in New Hampshire, and Memphremagog, which lies partly in Vermont and partly in Canada. The northern part of Maine is thickly strewn with lakes of great beauty and considerable size; and in almost every part of New England sheets of water are abundantly found under the designation of ponds, which in Europe from their size and beauty would be classed as lakes. The central and western parts of New York contain several large lakes, the most remarkable of which are Otsego, Oneida, Cayuga, Seneca, and Skaneateles. In the southern states lakes of fresh water are rarely found except in Florida, where the principal is Okeechobee, and in Louisiana, where there are many lakes formed by expansions of the numerous rivers. Of these latter, Lakes L'Allemand and Chetimaches are large bodies of water. In the states of the northwest, lakes are very numerous in Wisconsin and Minnesota; the great number and size of those in the latter form indeed one of its most remarkable geographical features. The most noted lakes in the states and territories on the Pacific side are the Great Salt lake and Pyramid lake in Utah, Klamath lake in Oregon, and Tulare lake in California.—The principal mountain chains of the United States are the Rocky mountains in the west and the Alleghanies in the east, the former being much the loftier and more extensive. These two chains divide the country into three great geographical regions: the Atlantic slope, between the Alleghanies and the Atlantic ocean; the Pacific slope, from the Rocky mountains to the Pacific; and the Mississippi valley, which lies between the two ranges. The Rocky mountains are a continuation northward of the Cordilleras of Central America and Mexico, and traverse in several ranges an area 1,000 m. broad from E. to W., embracing in all its parts nearly 1,000,000 sq. m. The most easterly of these ranges runs through the territories of New Mexico, Colorado, and Nebraska, and forms the dividing line between Dacotah and Washington; it includes in its ramifications the Spanish peaks, Pike's peak, and the Wind River mountains, in which is Fremont's peak, 13,570 feet high. The next great range of the Rocky mountains toward the west is called the Wahsatch mountains, lying S. of Great Salt lake, and under this and other names passing N. to the E. of that lake. In Utah these mountains spread over a wide district, and the ridges of the several peaks lie in various directions, the course of those known as the Uintah mountains being E. and W. The western portion of the Rocky mountain chain enters the United States on the S. from Lower California, and soon branches into two ranges, the highest of which, the Sierra Nevada, runs at the distance of about 160 m. from the Pacific, while the inferior parallel ridges, known as the Coast range, keep within 10 to 50 m. of the ocean, till in the N. part of California they mingle in confused groups again with the Sierra Nevada, where Mt. Shasta reaches an elevation of 14,000 feet. Through Oregon and Washington territory the distinction is still continued between the Coast range and the main range, which here drops the name of Sierra Nevada and takes that of Cascade mountains. The summits of the Sierra Nevada are generally above the limit of perpetual snow. The Coast range averages from 2,000 to 3,000 feet in height; but a few peaks rise to double that altitude, among them Mt. Ripley, 7,500 feet; St. John, 8,000; and Mt. Linn, the highest of the range, whose altitude however is not yet precisely ascertained. The Alleghanies, called also the Appalachian mountains, extend from Canada through western New England, the middle states, and the southern states, to Alabama. The White mountains of New Hampshire and the Adirondac mountains of New York are considered outliers of this great chain, though separated from the main stem by wide tracts of low elevation. The Catskills of New York also are outliers less distantly removed. All these groups are described in this cyclopædia under their own titles. The Alleghanies proper, not including these lateral groups, are about 1,300 m. in length, with an extreme width of 100 m., in Pennsylvania and Maryland, midway of their course.—The geological features of the states being described in the account of each one under its own name, it only remains to present a general outline of the formations in their range through the country. The most ancient rocks, and no doubt the oldest known strata in the crust of the earth, are those designated by the Canadian geologists the laurentian series. They consist of gneiss more or less granitic, quartz rock, limestones, dolomites, conglomerates, and, in the upper portion, of feldspathic rocks and great bodies of iron ore. They are largely developed over a great portion of Canada, where they attain a thickness of 40,000 feet, and also occur in the United States in the Adirondac region of northern New York. These crystalline formations differ from those regarded as of more recent date, which constitute the Green mountains and the White mountains and the greater portion of the New England states, in the absence of argillaceous, talcose, and chloritic schists, and are also marked by various other mineralogical characteristics. The next overlying series of rocks, known as the huronian, is found in Canada, to the north of Lakes Huron and Superior, in great beds of quartz rock, conglomerates, limestones, slaty rocks of peculiar character, and diorites, which altogether attain a thickness of about 10,000 feet, and overspread extensive districts. On the S. shore of Lake Superior, this formation contains enormous beds of iron ore at Marquette and other neighboring localities. This series is regarded as the equivalent of the cambrian sandstones and conglomerates described by Murchison. Though classed with the laurentian as azoic rocks, numerous indications are observed of both these formations having originally been sedimentary deposits, and like those of more recent date abounding in organic bodies of the vegetable and animal kingdoms, the forms of which have been destroyed by the metamorphic action to which the rocks have been subjected. The most ancient fossiliferous rocks (belonging to the primordial zone of Barrande, and recognized by some geologists as establishing a group below the lower silurian, named by Dr. E. Emmons as far back as 1844 the "Taconic system"), characterized by the *paradoxides Harlani* and other ancient genera of trilobites, are found in the argillaceous schists at Braintree, Mass., in the central portion of North Carolina, and possibly in some slates at Georgia, Vt., which however the Canadian geologists regard as equivalent to the "Quebec group," and this as contemporaneous with the calciferous and Chazy formations of the lower silurian of New York. It is also maintained that some sandstones in Iowa and Minnesota referred to the lower silurian should by reason of their fossils be placed in this lower system. The crystalline and schistose strata of New England, extending S. W. through the highlands of New York and New Jersey, and thence through the Appalachian chain to Alabama, have been variously classed by different geologists. They consist of feldspathic gneiss, quartz rocks, argillaceous, micaceous, talcose, and chloritic slates, &c.; and while regarded by some as forming the base of the Appalachian system, other geologists consider them as metamorphosed sandstones, shales, limestones, &c., of the lower silurian series. These, together with the unaltered rocks of this group, and those which succeed it, including the devonian and carboniferous, constitute the whole of this chain. From its range westward the whole country to the Rocky mountains, with the exception of the Ozark mountain region in southern Missouri and a few localities in Wisconsin and the northern peninsula of Michigan, contains no crystalline rocks. The lower silurian limestones come up to the surface at Cincinnati, O., Frankfort, Ky., and Nashville, Tenn., separating with the accompanying upper silurian members the great coal field of W. Pennsylvania, E. Ohio, Virginia, E. Kentucky, and Tennessee from the western coal fields of Illinois, Indiana, and W. Kentucky. On the north, a third coal field occupies the central portion of the lower peninsula of Michigan; and to the north-west a fourth coal field of great extent spreads over nearly the whole of Iowa, N. Missouri, and a large part of Kansas. The carboniferous series, wherever met with, is the uppermost formation, excepting in Illinois, Iowa, and Kansas, where the permian strata have been recognized. The great plains that extend from the Missouri and up the valleys of the Arkansas, Red river, &c., to the Rocky mountains, are almost exclusively occupied by cretaceous rocks, sometimes overlaid by those of tertiary age. These groups are an extension of those which form the whole country bordering the gulf of Mexico, and extending inland toward the southern extremity of the Appalachian mountains. Florida, Louisiana, and the coasts from Texas to Martha's Vineyard are composed of the tertiary, the belt gradually diminishing in width toward the north-east. The most recent members of this class are found in general near the coast, the older strata cropping out inland. Nowhere are they broken in upon or the strata disturbed by the intrusion of eruptive rocks of more recent date. Their elevation is evidently due to a continental and slow movement. The cretaceous formation passes across New Jersey and N. Delaware from New York bay to the head of Chesapeake bay, occurs at a few points in S. E. Virginia, near Wilmington, N. C., and through central South Carolina and Georgia, and thence stretches continuously in a broad belt through central Alabama, curving N. through N. Mississippi and W. Tennessee. It rests in general upon the metamorphic belt of the Appalachians, and the ascent to the higher platform of these rocks S. of New York is commonly marked by the first or lowest falls of the rivers, determining the head of navigation. (See APPALACHIAN MOUNTAINS.) The lower jurassic formation is represented in the narrow belt of red sandstones along the lower valley of the Connecticut, continued through New Jersey and across Pennsylvania into Virginia. The coal fields of S. E. Virginia and of North Carolina are referred to this group. Beside the great coast range of the tertiary formations already named, the newer pliocene is met with in scattered localities in the S. part of Maine and on the borders of Lake Champlain. The drift formation covers all the northern portion of the United States, the southern limit of the bowlders sometimes reaching lat. 40° N. The most southern diluvial scratches are found on the road through the gap of Peter's mount above Harrisburg near the Susquehanna, in lat. 40° 30′. The deposits of alluvium are of comparatively little extent, being mostly limited to the borders of the rivers and lakes. At the mouth of the Mississippi river only they spread out into a delta of broad area. Beyond the Mississippi valley the metamorphic groups of the Appalachians are repeated upon a grander scale in the Rocky mountains; but between the numerous ridges appear wide belts of the cretaceous strata and of modern tertiary deposits. Of such formations consist the vast arid plains and slopes stretching out toward the Pacific. In the mountainous districts are found all the formations from the lower crystalline groups to the coal, often traversed by great dikes of trappean and other eruptive rocks, some of which are traced to volcanoes but recently extinct or still active. An interesting volcanic district on the Colorado river of the West is described by Lieut. Joseph C. Ives in his report of explorations made for the U. S. government in 1857 and 1858. Beyond the Sierra Nevada and Cascade mountains the country extending to the Pacific is chiefly occupied by tertiary strata, which have been so broken up by movements of the crust and volcanic eruptions, as to present an excessively rugged surface and diversified structure. The metals in the Atlantic division generally follow the range of the Appalachians, and, excepting the copper region of Lake Superior, the lead mines of the West, and some iron mines in the same region, few metallic districts of importance are met with except in the crystalline rocks connected with this range of mountains. The metalliferous belts of New Mexico in like manner accompany the range of the same rocks in the Rocky mountains, and of California those of the Sierra Nevada, the debris from which, swept down into the tertiary strata, have furnished these with the precious metals for which they are extensively worked.—The soil presents almost every variety, from the dry sterile plains in the region of the Great Salt lake to the rich alluviums of the Mississippi valley. It can most conveniently be described by following the 7 great divisions indicated by the river systems of the country, viz.: the St. Lawrence basin, the Atlantic slope, the Mississippi valley, the Texas slope, the Pacific slope, the inland basin of Utah, sometimes called the Great or Fremont basin, and the basin of the Red river of the North. 1. The St. Lawrence basin embraces parts of Vermont, New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, and Minnesota, and all of Michigan; it is an elevated and fertile plain, generally well wooded. 2. The Atlantic slope includes all New England except a part of Vermont; all of New Jersey, Delaware, the District of Columbia, South Carolina, and Florida; and portions of New York, Pennsylvania, Maryland, Virginia, North Carolina, Georgia, Alabama, and Mississippi. It may be subdivided into two regions, a N. E. section and a S. W. section, separated by the Hudson river. The former is hilly, and generally better adapted to grazing than tillage, though some parts of it are naturally fertile, and a large proportion is carefully cultivated. The S. W. section may be again divided into a coast belt from 80 to 150 m. in width, running from Long Island sound to the mouth of the Mississippi, and including the whole peninsula of Florida; and an inland slope from the mountains toward this coast belt. The former as far S. as the Roanoke river is sandy and not naturally fertile, though capable of being made highly productive; from the Roanoke to the Mississippi it is generally swampy, with sandy tracts here and there, and a considerable proportion of rich alluvial soil. The inland slope is one of the finest districts in the United States, the soil consisting for the most part of alluvium from the mountains and the decomposed primitive rocks which underlie the surface. 3. The Mississippi valley occupies more than two fifths of the area of the republic, and extends from the Alleghany to the Rocky mountains, and from the gulf of Mexico to British North America, thus including parts of New York, Pennsylvania, Maryland, Virginia, North Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, New Mexico, Ohio, Indiana, Illinois, Wisconsin, and Minnesota, and all of Kentucky, Tennessee, Arkansas, Missouri, Iowa, Nebraska, and Kansas. It is for the most part a prairie country, of fertility unsurpassed by any region on the globe, except perhaps the valley of the Amazon. The ground in many places is covered with mould to the depth of several feet, in some instances to the depth of 25 feet. The N. W. part of the valley, however, offers a strong contrast to the remainder. There is a desert plateau from 200 to 400 m. wide lying at the base of the Rocky mountains, at an elevation of 2,000 to 5,000 feet above the sea, part of it incapable of cultivation on account of the deficiency of rain and lack of means of irrigation, and part naturally sterile. 4. The Texas slope includes the country S. W. of the Mississippi valley, drained by rivers which flow into the gulf of Mexico, and embracing nearly all of Texas and portions of Louisiana and New Mexico. It may be divided into 3 regions: a coast belt from 30 to 60 m. wide, low, level, and very fertile, especially in the river bottoms; a rich rolling prairie, extending from the coast belt about 150 or 200 m. inland, and admirably suited for grazing; and a lofty table land in the N. W., utterly destitute of trees, scantily supplied with grass, and during a part of the year parched with complete drought. Almost the only arable land in this last section is found in the valleys of the Rio Grande and a few other streams. 5. The Pacific slope, embracing the greater part of California, Oregon, and Washington territory, and parts of New Mexico and Utah, is generally sterile. That part however between the Coast range and the ocean, and the valleys between the Coast range and the Cascade range and Sierra Nevada are very fertile, and the same may be said of a few valleys and slopes among the Wahsatch and Rocky mountains, though these are better adapted to pasturage than to any thing else. 6. The great inland basin of Utah, which includes beside Utah parts of New Mexico, California, Oregon, and Washington, is probably the most desolate portion of the United States. It abounds in salt lakes, and there are only a few valleys where the soil acquires by irrigation enough fertility to afford a support for man. 7. That portion of the basin of the Red river of the North which belongs to the United States is confined to the small tract in the N. part of Dacotah and Minnesota; it contains some very productive lands, especially in the river bottoms.—The climate of the United States is as varied as might be expected in a country stretching through 25 degrees of latitude, and rising from low swampy shores to vast elevated and arid table lands and prodigious mountain ranges. With the exception of the peninsula of Florida, where the range of the thermometer during the year does not exceed 12°, its most prominent feature is fickleness. Transitions from heat to cold and from cold to heat, to the extent of 30° in a few hours, are common at all seasons in almost all parts of the country, and the alternations from rain to drought are nearly as remarkable. The summer is everywhere marked by intense heat, the thermometer rising sometimes as high as 110° F. In the north, however, this intense heat is seldom continued for more than a few days at a time, and in the southern states the heat, though long continued, is seldom so extreme. The Atlantic states have in general a temperature about 10° more severe than countries of the same latitude in western Europe, while California on the other hand has a climate as mild as that of Italy. The north-eastern states are subject to chill winds from the Atlantic, especially in the spring months, and the ice fields of British North America are the cradle of cold blasts which, having no mountain barrier to overcome, sweep over the northern states upon every considerable rise in the temperature further south. The great lakes mitigate to some extent the temperature of the country surrounding them, and other local features, such as the elevated plains of New Mexico, Oregon, and Utah, affect the climate of particular parts of the country. The isothermal line which passes through New Haven (aver-ago annual temperature 50°), in lat. 41° 18', deflects but little either N. or S. until it reaches Fort Laramie in Nebraska, whence it turns S. to lat. 35° in New Mexico, and then as suddenly stretches off to the N. into British Columbia. The following table shows the average temperature of each of the 4 seasons and of the year at several points on the Atlantic and Pacific coasts and in the interior:

Place of observation.	Latitude.	Spring.	Summer.	Autumn.	Winter.	Year.
Fortress Monroe, near Norfolk, Va.	37°	56.87°	76.57°	61.68°	40.45°	58.89°
Fort Columbus, N. Y. harbor.......	40° 42'	48.74°	72.10°	54.55°	31.38°	51.69°
Fort Sullivan, Eastport, Me........	44° 15'	40.15°	60.50°	47.52°	23.90°	43.02°
St. Louis, Mo.....	38° 40'	54.15°	76.19°	55.44°	32.27°	54.51°
Chicago, Ill.......	41° 52'	44.90°	67.33°	48.85°	25.90°	46.75°
Fort Ripley, Minn.	46° 19'	39.33°	64.94°	42.91°	10.01°	39.30°
Monterey, Cal.....	36° 36'	53.99°	58.64°	57.29°	51.22°	55.29°
San Francisco, Cal.	37° 48'	54.41°	57.33°	56.88°	50.86°	54.88°
Astoria, Oregon...	46° 11'	51.16°	61.58°	53.76°	42.43°	52.23°

Rain is abundant over the greater part of the republic, and pretty equally distributed throughout the year, as is shown by the following table of the fall in inches at various points:

Place of observation.	Spring.	Summer.	Autumn.	Winter.	Year.
Eastport, Me.............	8.88	10.05	9.85	10.61	39.39
Providence, R. I. (average 28 years).............	..	..	..	..	39.71
Albany, N. Y. (average 20 years)...............	..	..	..	..	40.00
New York..............	11.55	11.33	10.30	9.63	42.23
Philadelphia, Penn. (average 28 years)..........	..	..	..	..	42.30
Baltimore, Md...........	11.13	11.04	10.52	9.31	42.00
Washington, D. C.........	10.45	10.53	10.15	10.07	41.20
Charleston, S. C..........	9.89	17.45	10.06	7.52	44.92
Savannah, Ga. (average 9 years)................	..	..	..	..	49.43
St. Augustine, Fla........	5.90	10.54	9.56	5.80	31.80
Key West, "	8.84	16.59	15.35	7.87	47.65
Pensacola, "	12.86	18.69	13.71	11.72	56.98
New Orleans, La.........	11.29	17.28	9.62	12.71	50.90
Baton Rouge, "	15.08	19.14	12.48	15.40	62.10
Burlington, Vt. (average 13 years)...............	..	..	..	..	33.90
Buffalo, N. Y............	8.50	9.23	13.54	7.58	38.80
Pittsburg, Penn..........	9.38	9.87	8.23	7.48	34.96
Detroit, Mich............	8.51	9.29	7.41	4.86	30.07
St. Louis, Mo............	12.86	14.09	8.71	6.29	41.95
Fort Snelling, Minn.....	6.61	10.92	5.98	1.92	25.43
Fort Ripley, "	6.31	12.62	8.42	2.13	29.48
Fort Leavenworth, Kan..	7.97	12.24	7.33	2.75	30.29
Fort Smith, Ark.........	12.48	13.03	9.93	6.66	42.10
Fort Orford, Oregon.....	19.12	3.00	19.60	26.80	68.52
Fort Vancouver, Washington territory........	9.28	6.23	10.30	19.69	45.50
Fort Stellacoom, Washington territory........	11.19	3.85	15.20	21.51	51.75
San Diego, Cal...........	2.74	.55	1.24	5.90	10.43
Monterey, "	4.43	.21	1.65	5.91	12.20
San Francisco, Cal.......	8.31	.03	3.37	11.88	23.59
Benicia, "	6.40	.01	2.65	7.56	16.62
Sacramento, "	9.02	..	3.74	8.56	21.32

In the north Atlantic states the fall is more regular than in the coast states S. of Washington, being in the latter more plentiful than in the former, and more frequent in summer than in winter. On the Pacific coast the rains are periodical, occurring chiefly in winter and spring, and S. of lat. 40° in autumn also. Between long. 100° and the Cascade range there is very little rain, though even this sterile district experiences violent showers, especially among the mountains. The annual fall in the desert region through which the Colorado flows, is estimated at 3 inches; in the inland basin of Utah, 5 inches; in the great plain S. of the Columbia river, 10 inches; in the desert E. of the Rocky mountains, from 15 to 20 inches. Scarcely any of this fall occurs in summer. In the northern states snow frequently falls to a considerable depth, and in the region about Lake Superior more or less falls every day in winter, and does not melt until the spring. It is a comparative rarity S. of the Potomac, and when it does occur in the southern states it lasts but a very short time.—The most fatal diseases of the northern and middle states are affections of the lungs; of the southern states, bilious fevers, with occasional severe visitations of yellow fever along the gulf; and of the western states, intermittent and bilious fevers and dysentery. The fever and ague so prevalent in the west is attributed to the miasmatic exhalations incident to the breaking up of new lands, and rapidly disappears as the country becomes settled. The cholera has generally been more fatal in the valley of the Mississippi than in any other part of the country. According to the census of 1850, the number of deaths in the Union was 1 in every 72 inhabitants (1.39 per cent.), the greatest mortality being in Louisiana (1 in every 44), and the least in Oregon (1 in every 283). The following table shows the ratio of deaths to every 100 of the population in each of the states and territories for the year ending June 30, 1850:

Oregon..................	.35	New Hampshire......	1.33
Minnesota...............	.49	Virginia.............	1.34
Wisconsin..............	.95	Illinois..............	1.36
California..............	.98	Arkansas.............	1.44
Vermont...............	1.00	Mississippi...........	1.44
Florida.................	1.06	Ohio..................	1.46
Iowa....................	1.06	Texas.................	1.46
Georgia................	1.09	New York............	1.47
Michigan...............	1.14	Rhode Island..........	1.52
Alabama................	1.18	Kentucky.............	1.53
Tennessee..............	1.18	Connecticut..........	1.56
North Carolina.........	1.19	District of Columbia...	1.63
South Carolina.........	1.20	Maryland.............	1.65
Pennsylvania...........	1.24	Missouri..............	1.80
Indiana.................	1.30	New Mexico..........	1.83
Maine..................	1.30	Massachusetts........	1.95
Delaware...............	1.32	Utah..................	2.10
New Jersey............	1.32	Louisiana.............	2.31

Florida, which figures 6th in the above table, is considered as healthy as any other part of the country, a large proportion of the deaths in that state being of consumptive and other invalids from the north, who resort there in winter. In judging of the climate of some of the other states from the mortality tables, an allowance should be made for the large cities, in which the ratio of deaths is always much higher than it is in the rural districts.—The variety of geological formations occurring over the extensive territory of the United States insures the existence and economical production at one point or another of most of the minerals useful to man. Coal, which is every year becoming more valuable for fuel, and for the production of gas and other processes of the arts, exists in all the states except Vermont, New Hampshire, Connecticut, New York, and New Jersey, and is of 8 distinct qualities, anthracite, bituminous, and semi-bituminous. It is mined to a considerable extent, however, in only a few of the states, and the production in 1860, as returned by the census, was as follows:

States.	Bituminous.		Anthracite.	
	Bushels.	Value.	Tons.	Value.
Rhode Island	95,000	$28,500	1,000	$5,000
Pennsylvania	66,994,295	2,833,859	9,397,332	11,869,574
Maryland ...	14,200,000	464,338	....	....
Virginia.....	9,542,627	690,188	....	....
Georgia	48,000	4,800	....	....
Alabama....	10,000	1,200	....	....
Tennessee...	8,474,100	413,662	....	....
Kentucky ...	6,732,000	476,800	....	....
Ohio.........	28,339,900	1,539,713	....	....
Indiana	379,085	27,000	....	....
Illinois	14,258,120	964,187	....	....
Iowa.........	72,500	6,500	....	....
Missouri.....	97,000	8,200	....	....
Wash'n Ter.	134,850	32,244	....	....
Total....	144,376,927*	$7,491,191	9,398,332	$11,874,574

Marl is found in extensive and valuable beds in Maine, New Jersey, Maryland, Virginia, and some of the other states. Salt springs, some of them producing brine of extraordinary strength, occur in New York, Michigan, Virginia, Kentucky, and Arkansas. Nitrates of soda and potassa are found in the caves of Virginia, Kentucky, and Alabama, and nitrate and carbonate of soda on the plains of the great American desert and the eastern slope of the Rocky mountain range. Sulphate of lime (gypsum) occurs in Maine, Maryland, Texas, and some portions of New Mexico and Arizona. Marble of every variety for building, ornamental, and statuary purposes, is found in most of the states; and a carbonate of lime, compact and suitable for building purposes, supplies its place in the states bordering on the Mississippi. Of the metals, iron is found in every state and territory, and in every form known, from the pure metal to the bog ore containing not more than 20 per cent. of iron. Lead exists in small quantities in many of the states, but the great deposits of galena or lead ore are in Missouri, Arkansas, Iowa, and Illinois. Copper has been mined in considerable quantities in Connecticut, New Jersey, Virginia, North Carolina, Georgia, and Tennessee; but the great copper region is that near Lake Superior, where ore is produced which yields from 71 to 90 per cent. of pure metal. Zinc is found in great abundance in New Jersey and Pennsylvania, and to some extent in other states. Tin has recently been discovered in Maine under circumstances which indicate the probability of its becoming an important product of that state; and it has also been discovered in California in considerable quantities. Silver, which exists in combination with lead in all the deposits of lead ore, and is also found in connection with copper in some of the mines, exists in large quantities and is profitably worked in the territories of Nevada, New Mexico, and Arizona. It is also found in California, in the territory of Colorado, and in North Carolina. Gold is found in small quantities in Maine, Vermont, New Hampshire, Alabama, and Tennessee; Virginia, North Carolina, South Carolina, and Georgia formerly furnished the largest supplies of the country; while California, Oregon, Washington, Nevada, Arizona, New Mexico, Colorado, and Dacotah, with the colony of British Columbia, constitute probably the most extensive and productive gold region in the world. Platinum is found in California, though not in large quantity. Mercury is also found in California in such amount as to have supplied a considerable part of the large demand for it for mining purposes. Osmium and iridium have been discovered in Oregon, and are in demand by the manufacturers of gold pens. Cobalt occurs in North Carolina and Missouri; nickel in Connecticut, Pennsylvania, and Missouri; chromium in Vermont, New Jersey, New York, Pennsylvania, and Maryland; and manganese in Vermont, Massachusetts, Pennsylvania, and South Carolina. From the impossibility of obtaining correct returns of mineral productions, no tabular statement can be given; for fuller accounts and approximate estimates, the reader is referred to the separate articles upon them.—Botanists arrange the trees and shrubs of the United States in several provinces, each marked by a distinctive character and fixed limits. Two of these provinces extend northward into Canada, and two others pass over the boundaries in the south-west into Mexico; but the greater part are confined within the limits of the United States. 1. The lacustrian province extends along the basin of the great lakes and the St. Lawrence, and has for its boundaries the limit of forests on the north, the coasts of Labrador on the east, the line of N. lat. 43° on the coast, curving gradually southward to the Alleghanies, where it ascends again to the parallel of 60° at the Rocky mountains. Among the characteristic trees of this province are the *betula* or birch, of which 5 species are found, viz.: *B. papyracea* or paper birch, *B. excelsa*, *nigra*, *lenta*, and *populifolia*, known by the common names of yellow, black, sweet, and white old field birch; 2 species of *alnus* or alder, *A. incana* and *viridis*, or speckled and green alder; a single species of willow, *salix lucida*; 4 species of *populus* or poplar, *P. tremuloides* (aspen poplar), *balsamifera* (balsam poplar or tacamahac), *candicans* (balm of Gilead poplar), and *grandidentata* (soft aspen poplar); and 4 species of *abies* or spruce, viz.: *A. alba*, *nigra*, *balsamea*, and *Canadensis*, or white, black, balsam, and hemlock spruce or fir. Allied to the last named are the pines, of which only 3 are found in this province, *pinus Banksiana* (gray scrub pine), *resinosa* (red or Norway pine), and *strobus* (white pine). There are 2 junipers, *juniperus communis* and *Virginiana*, known as northern juniper and red cedar. The *thuja occidentalis* or Canadian arbor vitæ, the *taxus Canadensis* or Canadian yew, and the *larix Americana* or larch tamarack, are the only other evergreens.

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* Equal to 5,775,077 tons.

There are 3 species of cherry, *cerasus Virginiana, serotina,* and *Pennsylvanica,* respectively known as choke, black, and red wild cherry; and allied to these is the *prunus Americana* or northern wild plum. There are 4 species of maple, *acer saccharinum, rubrum, Pennsylvanicum,* and *spicatum,* or sugar, red, striped, and mountain maple; 3 species of ash, *fraxinus Americana* and *sambucifolia,* white and black ash, and *pyrus Americana,* or American mountain ash; 2 species of elm, *ulmus Americana* and *racemosa,* or the weeping and northern corky elm; 4 species of oak, *quercus rubra, obtusiloba, alba,* and *macrocarpa,* or red, post or iron, white, and burr oak. The linden or basswood (*tilia Americana*) and red beech (*fagus ferruginea*) occur sometimes in large numbers, forming almost entire forests; the hop hornbeam, ironwood, or leverwood (*ostrya Virginica*) is less abundant, but occasionally appears with other trees. The box elder (*negundo aceroides*), the smooth sumach (*rhus glabra*), and the service berry (*amelanchier Canadensis*) are the principal tree-like shrubs of the province. 2. The Appalachian province comprises all of the Atlantic states S. of lat. 43° and E. of the border of the prairies, including thus both slopes of the Alleghanies and the low lands between them and the coast, as well as the Tennessee and Ozark mountains. This is divided for convenience into 6 regions, whose names sufficiently explain their situation, viz.: the Alleghany, Ohio, Tennessee, Carolina, Mississippi, and Florida regions. The trees of the Alleghany region are to a considerable extent allied, though often of different species, to those of the lacustrian province. Evergreens are not abundant, 4 species only, *pinus rigida, pinguis,* and *inops,* or northern pitch pine, Table mountain pine, and Jersey scrub pine, and *abies Fraseri* or southern balsam fir, being all that are peculiar to the region. The oak, of which there are 4 species, the chestnut (2 species), the hickory (3 species), and the butternut and black walnut (2 species), are the characteristic trees of this region; there are also 2 species of ash, *fraxinus pubescens* and *viridis,* and one each of logwood (*cornus alternifolia*), willow (*salix nigra*), *kalmia* (*latifolia*), *rhododendron* (*maximum*), buttonwood (*platanus occidentalis*), maple (*acer saccharinum,* var. *nigrum*), sassafras (*S. officinalis*), locust (*Robinia viscosa*), crab apple (*pyrus angustifolia*), and fringe tree (*chionanthus Virginianus*). Of shrubs, 2 species of sumach, the velvet and poison (*rhus typhina* and *venenata*), are the principal which are peculiar to the region. There are 3 species and numerous varieties of the grape common to this and the Ohio region, and one of them also to the Tennessee region, viz.: *vitis labrusca, æstivalis,* and *cordifolia,* or the fox, summer, and frost grape. The Ohio region has but few characteristic trees; the most prominent are the *æsculus glabra* or Ohio buckeye, the *cercis Canadensis* or redbud, scarlet and swamp oak (*quercus coccinea* and *palustris*), 3 hawthorns (*cratægus crus-galli, coccinea,* and *tomentosa*), a soft maple (*acer dasycarpum*), the northern hackberry (*celtis occidentalis*), the red mulberry (*morus rubra*), and the northern prickly ash (*xanthoxylum Americanum*). To the Tennessee region belong the pawpaw (*asimina triloba*), the cucumber tree (*magnolia acuminata*), as well as the large-leaved and other magnolias (*macrophylla, umbrella,* and *Fraseri*), the bitter hickory (*carya amara*) and thick shellbark hickory (*C. sulcata*), the common locust (*Robinia pseudocacia*), the eatable buckeye (*æsculus macrostachya*), the yellow wood (*cladastris tinctoria*), 2 species of the *Halesia* or bell tree, *H. diptera* and *tetraptera,* the Osage orange (*Maclura aurantiaca*), the thick-leaved elm (*ulmus crassifolia*), the smoke tree (*rhus cotinoides*), the honey locust (*Gleditschia triacanthos*), one species of hawthorn (*cratægus cordata*), the southern beech (*fagus sylvestris*), the lousewood (*oxydendrum arboreum*), the yellow or spruce pine (*pinus mitis*), and the laurel or shingle oak (*quercus imbricaria*). The coast or Carolina region, which really extends from Maine to Georgia, has for its characteristic trees the dogwood (*cornus*), of which there are 5 or 6 species; the magnolia, of which there are at least 4 species, one of them, *M. grandiflora,* being one of the most beautiful flowering trees of North America; the *cratægus* or hawthorn, 4 species; the *cupressus* or cypress, and the *taxodium,* an allied genus; the *chamærops palmetto,* or tree palmetto; 2 or 3 species of pine, one of them of great commercial importance; the stately *liriodendron tulipifera,* known by the names of whitewood, tulip tree, American poplar, &c.; 8 or 9 species of oak, of which the most peculiar are the Spanish oak (*quercus falcata*), whose parasite the Spanish moss gives it so funereal an appearance; the blackjack oak (*Q. nigra*), whose wide-spreading roots form a corduroy network, which greatly impedes locomotion on the ordinary highways; and the live oak (*Q. virens*), which furnishes the finest ship timber in the world. There are also several species of *bumelia,* and at least two of the *nyssa* or gum tree, viz., *N. multiflora* (pepperidge or sour gum) and *N. uniflora* (southern tupelo). The cottonwood (*populus angulata*), though properly belonging to the Mississippi region, is found to some extent in the low lands of the southern Atlantic states. There are several species of the *Gordonia* or bay, one of them common to this and the Mississippi region. A single species of a tribe allied to the bamboo, the *arundinaria macrosperma* or giant cane, is found as far N. as lat. 38° 30′; the persimmon (*diospyros Virginiana*), and the single representative of the chestnut tribe, the chinquapin (*castanea pumila*), also belong to this region. The characteristic forest vegetation of the Mississippi region consists rather in large forests of particular species than in any considerable number of species. The cottonwood is abundant along the streams; the cypress (*taxodium*) is found near the bayous and swamps; the *magnolia grandiflora* is found also in low situations, as are several species of swamp oak (*quercus prinus* and *aquatica*), hickory (*carya microcarpa*), and ash (*fraxinus platycarpa*). The catalpa (*C. bignonioides*), planer tree (*planera aquatica*), Chickasaw plum (*prunus Chickasa*), and buckwheat tree (*Cliftonia ligustrina*) are among the more remarkable of the forest trees native to this region. The lime, lemon, orange, and fig, which have been introduced from the West Indies, flourish luxuriantly. Of climbing plants, the Catawba grape is a native of this region. In the Florida region, the principal forest trees are the live oak (*quercus virens*); the *Eugenia latifolia*, *procera*, and *buxifolia*, or Eugenia; the *Torreya taxifolia*, or stinking cedar; two species of fig, *ficus brevifolia* and *aurea;* the bitter-wood (*simaruba glauca*), whose bark is used for medicinal purposes; two species of wild plum, *cocoloba uvifera* and *Floridana;* the *chrysobalanus icaco*, or cocoa plum; the *papaya vulgaris*, or true pawpaw; the *anona laurifolia*, or laurel-leaved custard apple; the *acacia latisiliqua*, or broad-pod acacia; the *psidium buxifolium*, or box-leaved guava; the *crescentia*, or seven-year apple; the *laguncularia* and the *rhizophora*, both called mangrove; the *ardisia Pickeringii*, or Florida ardisia; and the *rhus metopium*, or broad-leaved poison sumach. A peculiarity of the region is the predominance of fruit-bearing trees. 3. The campestrian province comprises the vast extent of prairie lands, reaching from the Saskatchewan on the N. to Texas on the S. This province is mostly treeless except near the streams; it has very few trees which are not common to it with the Mississippi, Ohio, and Canadian regions. The pecan nut (*carya olivæformis*), though found in the Mississippi region, attains its greatest perfection here. The cottonwood (*populus monilifera*), the white elm (*ulmus Americana*), the white ash (*fraxinus Americana*), and the red cedar (*juniperus Virginiana*) are the most abundant trees of the province, though none of them peculiar to it. 4. The Rocky mountain province, like the preceding, has few peculiar or characteristic trees as yet known. The table lands stretching eastward from the summits of the Rocky mountain range are treeless and almost verdureless, except on the immediate banks of the streams, where a few cottonwood or other trees of quick growth and spongy fibre are found; elsewhere the wild or bitter sage (*artemisia tridentata*), greasewood (*Purshia tridentata*), and other plants of a like character form the only herbage of the barren and soda-covered soil. Higher up on the mountain slopes there are found 3 species of pine, and perhaps more, viz., *pinus Wislizeni*, *flexilis*, and *monophyllus*, the last a variety of the valuable nut pine. A single species each of maple (*acer tripartitum*), willow (*salix pentandra*), cedar (*juniperus occidentalis*, found in Utah), hackberry (*celtis reticulata*), and elder (*negundo Californicum*), complete the list of known forest trees of this province. 5. Of the caurine or north-western province, only Washington territory and Oregon above lat. 42° 30′ belong to the United States. The abundant moisture of this region develops forest trees of immense height and girth, and though the number of genera is not as great as in the Appalachian province, there is a very considerable number of species. The evergreens predominate. The finest pines are further south, 3 species, only one of them of considerable size, being found N. of lat. 42° 30′; these are *pinus monticola*, *contorta*, and *ponderosa*, the last a noble yellow pine, tall, and having a dense heavy wood. The fir is at home in these northern mountains; 7 species are found here, one of which, the *abies grandis* or yellow fir, is the noblest of the tribe, though hardly surpassing in beauty the *A. amabilis* or Oregon silver fir. The Oregon white cedar (*thuja gigantea*), the Oregon yew (*taxus brevifolia*), and the north-western larch (*larix occidentalis*) are the only other evergreens. Two species each of willow and maple, one of alder, two of dogwood, two of manzanita (*arctostaphylos glauca* and *tomentosa*), and one each of ash, oak, hawthorn, crab apple, rhododendron, laurel, and chestnut, constitute the other known trees of this province within the limits of the United States. 6. The Nevadian province, extending from lat. 42° 30′ to 32° N., is the home of the giant pines, cedars, and redwoods, trees of unparalleled size. The list of evergreen trees comprises 7 species of pine, viz., *pinus Sabiniana* (California nut pine), *insignis* (western pitch pine), *blauans* (Newberry's nut pine), *Lambertiana* (the sugar pine), *Coulteri* (Coulter's nut pine), *muricata* (spiny shell pine), and *Torreyana* (Torrey's pine); 2 of *sequoia*, *S. sempervirens* and *S. gigantea*, or common and giant redwood; 2 of spruce, *abies Williamsoni* and *bracteata;* 6 of live oak, *quercus chrysolepsis*, *agrifolia*, *densiflora*, *Hindsii*, *lobata*, and *acutidens;* 3 of cypress, *cupressus Lawsoniana*, *macrocarpa*, and *Gowana;* the *juniperus pachyphlæa*, or thick-bark juniper; the *thuja plicata*, or Mexican arbor vitæ; the *oreodaphne Californica*, or mountain bay; and the *libocedrus decurrens*, or California cedar. Among the deciduous trees are 2 species of oak, *quercus Californica* and *Douglassii;* the *juglans rupestris* or Mexican walnut; and one species each of the buckeye, buckthorn, wild plum, redbud, sycamore (*platanus racemosa*), *Torreya*, dogwood, *ceanothus* (here a tree), cherry laurel, yucca, laurel, sumach, alder, poplar, pistachio tree, &c. All these are peculiar to this province. 7. The Mexican province, including New Mexico, Arizona, and northern Texas, is divided into three distinct regions, rising in successive table lands from the low sandy desert to the Llano Estacado or Staked Plain and the plateaus of New Mexico. Except in isolated tracts, this province is not marked by an abundant forest growth, but the greater part of its trees are at least semi-tropical in character. Six species of cactus, of 5 different genera, are found in the lowlands of this province, to which belong also 2 species of *Parkinsonia*, *P. microphylla* and *aculeata*, both known by the Mexicans and Texans as *paloverde*; *Olneya tesota*, *cercidium floridum* (green acacia), *Larrea Mexicana* (*hediondo*), and *schinus molle* (Peruvian pepper tree). On the first table land, that of the Llano Estacado and central Texas, the mezquite, *algarobia glandulosa*, and its congener, *strombocarpa pubescens*, with their deeply penetrating roots, their luscious honey-bearing pods, and their abundant gum, are the characteristic trees. In the Cross Timbers, and in small groves elsewhere, are also found *quercus oblongifolia*, the oblong-leaved live oak, *acacia Greggii*, *pinus edulis*, the New Mexican nut pine, and rarely the square-leaved juniper (*juniperus tetragona*), the California palm (*Brahea dulcis*), the Japote persimmon (*diospyros Texana*), and the Chihuahuan pine (*pinus Chihuahuana*). Still further north on the table lands of Arizona and New Mexico are found 8 species of oak, 2 of them live oak, viz., *quercus Emoryii*, *confertifolia*, and *Gambelli*, the last a white oak peculiar to Arizona. Along the river banks of this region the cottonwood is replaced by *fraxinus pistaciafolia* or Arizonian ash. Of shrubs the principal are the *rhus microphylla* or small-leaved sumach, and the *berberis Fremontii* or Arizonian barberry.—The character and quantity of forest vegetation is largely controlled by climatic influences. A humid climate, even if accompanied by low temperature, is favorable to the growth of forests, and hence we find northern Maine, New Hampshire, Vermont, and New York covered with immense forests. Where the cold is intense and the fall of rain moderate, the trees, except the hardiest, are killed by the deep frosts. The trees of these cold regions are for the most part evergreens, though some species of the oak, beech, &c., thrive. In the Appalachian region again, forests are more abundant on the eastern slope of the Alleghanies than on the western, and far more so than in the campestrian or prairie province, because the amount of rain is greater and the moisture more uniformly maintained. The clouds rising from the Atlantic are deprived of the greater portion of their moisture in their passage westward, and disappear in passing the Alleghanies. But for the great lake region of the north, which yields to the clouds a daily evaporation nearly or quite equal to ½ of that of the north Atlantic, and the gulf of Mexico at the south, whose vapors are driven northward by the south winds, the Mississippi valley would form another desert like that of Gobi. As it is, the moisture was in many portions of the region insufficient to enable the forest trees to resist, as those of the Appalachian region have done, the frequent fires which proved so destructive to the dry herbage of the prairie lands. Along the western coast of North America we find forests of gigantic growth on the seaward slope of the Cascade and Coast ranges, while eastward of those ranges we come to a treeless region, where fuel can only be procured from the deposits of coal, and where crops can only be produced by irrigation. Lying between this and the head waters of the western affluents of the Missouri and Mississippi, is a still more barren and verdureless region, where rain rarely falls, and where, except along the banks of streams fed by the melting of the mountain snows, but dry through a part at least of the summer, there is neither food for cattle nor fuel for the use of man. The cold of the mountain ranges has also something to do with the distribution of trees. At the height of 8,000 feet (under the general law that the mean temperature decreases 3 degrees for each 1,000 feet of elevation) we find plants whose place on the lowlands would be 2 or 3 degrees further north. Especially is this the case on the mountains of the Cascade range, where in some instances the trees of Russian America reappear on the higher slopes of the mountains of California and Oregon.—The grasses indigenous to the United States are very numerous, and some of them of great value. Botanists enumerate 71 genera and 261 species of native *gramineæ*, including under this title some of the cereal grains and several species of maize, sorghum, sugar cane, &c. In the northern and middle states the cultivated grasses are mostly of European origin and naturalized; but in the southern, south-western, and western states, and in the region bordering on the great lakes, there are many native species fully equal to any of the European grasses. Among these are *sizania* or wild rice, of which there are 3 species found in the vicinity of the lakes and along the S. and S. W. bays, ponds, sounds, and river banks; *agrostis* or bent grass, of which there are 6 species and numerous varieties, the *A. alba*, var. *dispar*, or southern bent grass, being the one most highly esteemed; *stipa*, or oat grass; musquit grass, of which there are several species and many varieties, a native of Texas, and furnishing most delicious pasturage to the cattle and sheep of that region; *elymus* or sorrel grass; wild rye, a native of the gulf states, highly prized for a winter pasture; *poa compressa*, the blue grass, regarded throughout Kentucky and Tennessee as the best pasture grass known; *uniola*, wild oats or union grass, 4 species of which are natives of the southern states, and the *U. nitida* is highly prized; *paspalum*, of 21 species, of which several are valuable for grazing purposes; *cynodon dactylon*, Bermuda grass, a creeping grass on sandy soils, but very nutritious; and *arrhenatherum*, or oat grass, called also Oregon grass, Utah grass, &c., a native of the west and southwest, an excellent grass for hay, and much valued for grazing in winter.—Embracing a territory of such extent, the number and variety of flowering plants in the United States is very great. Each region has its flora, and each season its characteristic blossoms. We can only glance at the most striking features of this floral display. In the north-eastern and middle states, the most noticeable of the flowers of early spring are the brilliant blossoms of some of the *compositæ*, and especially in the lowlands the bright yellow of the dandelion (*taraxacum dens-leonis*), and the purple flowers of the *geraniaceæ*, represented in that region by the *geranium maculatum;* a little later the dogwood (*cornus florida*) is in full blossom, the tree completely whitened with its creamy white flowers. The hawthorn, of which there are 14 or 15 species, is also one of the earliest of our native flowering shrubs, and its white blossoms are seen in all parts of the country. The delicate native primrose (*primula mistassinica* and *farinosa*) is less abundant, but of great beauty. A little later the native genera of the order *rosaceæ*, and particularly the wild roses and eglantines, as fragrant as beautiful, and the showy *Kalmia* or broad-leaved laurel, of the order *ericaceæ*, the *vaccinium* or blueberry, and the *Gaylussacia* or whortleberry, with their delicate pink and white flowers, as well as most of the fruit-bearing trees, are in full blossom. By the latter part of June the *umbelliferæ*, an order represented by some hundreds of genera and species, and the *cruciferæ*, numbering nearly as many, though of humbler pretension, have contributed their quota of flowers; to these are added the *ranunculaceæ*, or buttercup tribe, some of the genera of which indeed display their golden flowers in April and May. From July to October is the blossoming period of the great order of *compositæ*, though some of its most numerous genera do not mature their flowers till still later in the autumn. The *achillea* or milfoil; the more than 20 species of *coreopsis* with their yellow flowers; the coarse but brilliant *helianthus* or sunflower family, of which there are 25 indigenous species; and the *erigeron* or flea bane, with its purplish flowers, appear in great profusion in July, August, and September; as do also *scutellaria* (skullcap), *leonurus* (motherwort), and several other of the *labiatæ*, and the brilliant scarlet, crimson, and purple flowered lobelias. In October and November the neglected fields and roadsides are brilliant with the pink flowers of the *aster* and the nodding plumes of the *solidago* or golden-rod, two prominent members of the order of *compositæ;* and mingled with them are numerous less conspicuous flowers of the same or allied orders. In the region of the prairies the succession of flowers is somewhat different. The number of genera and species is smaller, but the varieties are almost endless. Among the earliest flowers are the pale blue *hepatica* and other of the *ranunculaceæ* of more brilliant colors, and almost as early the exquisite flowers of the *cratægus tomentosa* or black thorn, and the beautiful but scentless crimson rose of the prairies, *rosa setigera*. A week or two later the white and peculiar flowers of the *podophyllum peltatum* or wild mandrake appear on the banks of the streams. In May and June the prairies are resplendent with flowers of all hues. The deep blue of *viola delphinifolia* (larkspur violet), the white, red, and purple of the *Houstonia*, and the variegated clusters of *Claytonia Caroliniana* and *Virginica*, appropriately named "spring beauty," with their hues of white, rose, red, and purple, blending with the rich golden yellow of the later *ranunculaceæ*, with occasional patches of other flowers or varieties of them differing only in color, make a western prairie an attractive object. Later in the season purple is the predominant color, though the dark hues of the *Heuchera* (alum root), the *liatris*, and the *eupatorium*, a species of boneset, are relieved by the brilliant white of the *silene stellata*, and the rich sulphur yellow, with purple centre, of the *abelmoschus manihot*. Still later, as at the east, the *solidago* and *aster*, though of different species, maintain their superiority among the odorless flowers of autumn, though the native verbena gives some variety to the landscape. In the region extending from Carolina to Louisiana, we find flowers of a still different character. The *magnolia grandiflora*, the *azalea calendulacea* or pinxter bloom, and the *rhododendron punctatum* are the finest of the flowering shrubs; while the numerous species of *clematis* with their white and purple flowers, the golden blooms of the *hypericum aureum*, the bright scarlet of the *silene regia* or splendid catchfly, and the purple and carmine of the *hibiscus*, form a rich blending of colors. The hawthorn has its representatives here also; and though its modest flowers are not conspicuous among the more gorgeous semi-tropical flora, its fruit attracts attention from the brilliancy of its color. The southern states have no native rose, unless *rosa lævigata*, the Cherokee rose, usually said to have been brought from China, be really indigenous there. Two species of *spiræa* (hardhack), *S. corymbosa*, with its rose-colored corymb of flowers, and *S. aruncus*, with small racemes of whitish blossoms, are among the noticeable members of the order *rosaceæ* in that region. *Calycanthus floridus*, or sweet-scented shrub, remarkable rather for its exquisite fragrance than for the beauty of its flowers, is also a southern plant. *Œnothera speciosa*, or evening primrose, is an elegant plant, with large white or roseate flowers, a native of Arkansas and Texas. Another flower of great beauty is the *passiflora incarnata* or passion flower, a native of North and South Carolina. The *Pinckneya pubens*, a singularly beautiful shrub of the order *rubiaceæ*, is a native of the coast from South Carolina to Florida, and bears clusters of flowers of a delicate purple. There are numerous species of the *liatris* also in this region, with rich purple flowers. The coarse but brilliant lobelias and the asters and golden-rods make up their full share of the flowers of autumn. Their monotony is relieved by other flowers equally showy and less coarse and weed-like in appearance. *Echinacea purpurea* or purple cone flower, *Rudbeckia triloba*, with flowers of deep purple and gold, and *helianthus radula*, with a dark purple disk and yellow rays, are among these. Texas has in many respects a different flora from any of the states E. or N. E. of it. The dogwood, of which there are several species, flowers in March, and the dwarf buckeye (*æsculus Texanus*) in the same month. These, however, are among the later flowers. *Houstonia cerulea*, called there bluets, puts forth its azure blossoms in January and February, and the white draba (*draba cuneifolia*) from the 1st to the 15th of February. Late in February or early in March, the formidable *yucca aloifolia*, or Spanish dagger, conceals its deformities with its abundant white and violet blossoms; the *phlox involucrata*, or wood phlox, displays its rich carmine or purple flowers, and soon after its congener, *Gilia coronopifolia*, waves its scarlet plumes; *cratægus spathulata*, the Texan hawthorn, is also covered with its corymbs of white flowers; and the glossy deep green leaves of the black haw (*viburnum prunifolia*) contrast finely with its snow-white blossoms early in March. A little later come the various species of primrose, the purple lupines (*lupinus villosus*), and the *Krigia Caroliniana* or dwarf dandelion. Through April and May and into the earlier days of June these flowers with a few others continue to blossom; but the summer heats soon dry up vegetation except along the banks of the streams, the grasses protect their green leaves from the fierce and continuous heat by the thatch of dead grass which falls over them, and for two months nature dresses in russet. With the autumnal rains new flowers spring up. The order *compositæ* now predominates here as further north, but it is rather the *coreopsis, helianthus, silphium* or rosin weed, and *chrysopsis*, than the *solidago*, which make up the yellow blooms of autumn. Of *solidago* but a single species is known in Texas, and that not very abundant. A few species of the *aster* make their appearance, and the dahlia, a native of Mexico, finds its way across the border, but displays few of that infinitude of colors which careful cultivation has produced in the northern states and Europe. In the extreme west of Texas, along the Rio Grande, the cacti of the genera *opuntia, melocactus, cereus, mammillaria* (*grandiflora, flagelliformis*, &c.), conceal their rough and terrible thorns with the most gorgeous flowers. The region north of Texas, and extending through Arizona, New Mexico, Utah, and Colorado, is not prolific in flowers. *Artemisia* of 4 or 5 species, really a wormwood, though called by the hunters wild sage, and *senecio*, or fire weed, are the principal plants on the plains. The most remarkable flowers of the region are 2 species of *spiræa*, one, *S. dumosa*, a new species with beautiful plumes; a fragrant and elegant *œnothera* (*cæspitosa*), or evening primrose, with large white flowers; and *Cowania Stansburiana, Heuchera rubescens*, and *monothrix Stansburiana*, three new species of very singular appearance. The last named belongs to the order *compositæ*, and its flower possesses considerable beauty. The flora of California and Oregon is very abundant, and differs greatly in character from that of the country lying east of the Sierra Nevada or the Rocky mountains. Even where the same genera are found, the species are entirely different. There are numerous flowering plants of the order *scrophulariæ*, which are exquisitely beautiful. Among these are 2 or 3 species of *mimulus*, or monkey flower: *M. luteus*, with large and very showy flowers, yellow with spots of rose or purple; *M. cardinalis*, with brilliant scarlet flowers; and *M. moschatus*, or musk plant, with yellow flowers, and exhaling the odor of musk; and 2 species of *pentstemon*, or beard tongue: *P. speciosus*, with a rich blue flower, and *P. barbatus*, a bright scarlet flower. Of the *hydrophyllaceæ* there are 2 species: *nemophila insignis*, a white flower with a blue border, and *N. maculata*, white with violet-colored spots. Another exquisite flower of the order *polemoniaceæ* is the *Gilia tricolor*, with a limb of lilac blue, throat purple, and tube yellow. The indigenous plant in California, however, which in its season of flowering most attracts attention, is the *ribes speciosum* or flowering currant, whose large crimson racemes are unrivalled in beauty; a kindred species, *R. sanguineum*, is found in Oregon. A peculiarity of the flora of California is the almost entire absence of genera belonging to the two great orders *rosaceæ* and *compositæ*. The large genera of *cratægus* (hawthorns), *rosa, cerasus* (cherries), *prunus* (plums), *pyrus* (apples), and *rubus* (bramble), in the former, are scarcely represented at all; while in the latter we miss *aster, solidago* (golden rod), *coreopsis, helianthus* (sunflower), *erigeron* (flea bane), *chrysopsis, eupatorium* (boneset), &c. This deficiency is more than made up by the amplitude of some orders, such as *scrophulariæ* and *hydrophyllaceæ*. In general it may be said that the flora of the United States comprises few or none of the great staples of food; the cereals and all the esculent roots are naturalized, but many of them have been greatly improved by their transfer, and are now produced here of better quality than anywhere else in the world. The edible *cucurbitaceæ* (cucumbers, melons, squashes, &c.) are also all naturalized, as are most of the fruits, especially the apple, pear, plum, peach, quince, and apricot. The edible berries, such as the strawberry, blackberry, raspberry, whortleberry, bilberry, cloudberry, &c., are indigenous. The great fibrous staples too, cotton, flax, and hemp, are naturalized plants; while the agave, which possesses some qualities analogous to the last of these, is a native of the adjacent country of Mexico.—The zoology of the United States is essentially that of North America, nearly every species found on the North American continent having its habitat in some part of the states or territories. The *quadrumana*, embracing the entire monkey tribe and its congeners, are wanting. Of the *cheiroptera*, or bat tribe, there are 3 genera and 11 species. Of the *sarcophaga*, or as they are frequently called *carnivora*, the largest is the cougar or catamount, often improperly called panther, which is not a native of this continent; he is a formidable animal, second in strength and ferocity among the *felidæ* to the lion and Bengal tiger. The wild cat or bay lynx, a smaller but ferocious creature, and the Canadian lynx, are the only other indigenous animals of the cat tribe. There are 6 species of the fox, and possibly 7, the common red, the cross fox (by some considered only a variety of the red), the black or silver, the prairie, swift, gray, and short-tailed fox. Of wolves there are 2 widely different species: the gray wolf of the wooded districts, a savage though cowardly animal, of which there are several varieties, known as the reddish, black, and giant wolf, but all apparently belonging to the same species (*canis occidentalis*); and the prairie wolf, the American representative of the oriental jackal. To the *digitigrada* also belong the pine marten or American sable, the American fisher, 2 species of mink, and the weasel and American ermine. Among the *plantigrada* we have the black bear, which is not uncommon in the wooded regions of the Atlantic states, and which, though reckoned a flesh-eater, subsists principally on honey, grain, berries, and fruits; the grisly bear, the largest and most formidable of American carnivora; and possibly another species, hardly less in size, though of not quite so ferocious a temper, a native of the region west of the Rocky mountains, and known as the California bear. The remaining members of the order found here are the badger, the wolverene or glutton, 6 species of skunk, and the raccoon, of which there are 2 species, the common and the black-footed raccoon, the latter occurring only west of the Rocky mountains. Of the *pinnigrada*, or seal family, but one representative, the common seal, occurs on the United States coasts, though some of the other genera and species may rarely be drifted on icebergs to its northernmost limits. The *ruminantia* are represented in considerable numbers in the United States. Among the *cervidæ* or deer family we have the moose, now confined to the N. E. states, and very scarce even there; the wapiti, commonly but incorrectly called the elk; and 5 or 6 species of deer, known as the Virginian, Californian black-tailed, Columbian black-tailed, the long-tailed, and the mule deer, and possibly one or two other species. There is one and perhaps two species of antelope, the American prong-horn, a native of the Rocky mountain region, and a congener of the chamois, being the one best known; and one of the sheep family, the bighorn or Rocky mountain sheep, found in the whole region of the Rocky mountains and Sierra Nevada. The bison, usually though incorrectly called the buffalo, is the only wild representative of the ox family. Of the amphibious mammals, a singular species of the manatee or sea cow frequents the shores of Florida and the gulf of Mexico. The porpoise, and 5 or 6 species of dolphin, among them the white fish or white whale, and the narwhal, are found along the coast; and the smaller species of whale are not uncommon, while the great sperm whale appears at some distance from the coast, but in the latitude of our possessions on the Pacific. The *insectivora* are represented by the mole, 3 genera and 7 or 8 species, and by 12 species of shrew mole, all of them belonging to the genus *sorex*. Among the numerous representatives of the great order *rodentia* in the United States are the beaver, 2 species of porcupine, 10 or 12 of squirrels proper, beside half a dozen of flying squirrels, 4 or 5 prairie squirrels, 2 prairie dogs, and the gopher or pouched rat, of which there are several species; the woodchuck or American marmot; the muskrat; the rat tribe, of which 2 genera and 3 or more species are indigenous, viz., the Florida or wood rat, the bush rat, and the cotton rat, and according to some also the roof or white-bellied rat, but this seems to be of European origin; the mouse tribe, including the common mouse, of which there are 4 genera and 19 or 20 species; the meadow mouse of numerous species; the lemming, of which there are at least 2; the hare or long-eared rabbit, of which there are at least 6 species; and the short-eared or true rabbit, of which there are 4 or 5. The *marsupialia*, which in Australia form so important a class of mammals, are in the United States represented by a single genus, the opossum, of which there are 2 species, one east and the other west of the Mississippi river.—Of birds the genera and species are so numerous, that only the more prominent can be named. Of the order *raptores* (birds of prey), the eagle, of which 5 species have been ascertained to exist in the United States, takes the first place. Next follow the vultures, of which at least half a dozen species inhabit the United States, from the giant king vulture of California to the turkey buzzard and carrion crow of the eastern states; the hawks, of which there are not less than 25 or 30 species, including the falcon, kite, hen hawk, goshawk, sparrow hawk, &c.; and the owls, of which there are at least 40 species. The *scansores* or climbers are represented by the Carolina parrot, the only bird of the parrot tribe in the United States, and the woodpeckers, a well known genus, of which there are many species. The order *insessores*, formerly called *passerini* or *passeres*, is very numerous in the United States, and includes the song birds as well as those distinguished by their cry or sharp shrill note. The most common members of the order are the thrush tribe, including the bird here called robin (a name which in Europe is bestowed on an entirely different bird), the mocking bird, and its hardly less skilful congener as a mimic, the cat bird;

the swallows, a numerous family; the finch tribe, which includes the sparrows; the kingfishers; the crow tribe; the orioles, noted alike for the beauty of their plumage and the variety of their song; the grakles or starlings; and, last and least, but the most beautiful of all, the humming birds. The *rasores*, divided into the sub-orders *columbæ* and *gallinæ*, are also numerously represented. Pigeons and doves of numerous species are found in vast numbers in the wooded portions of the western and north-western states, and are not uncommon in any part of the Union. There are no true partridges in the United States, the partridge of the northern states being a grouse, and that of the southern states a quail; but the grouse, of at least a dozen species, quail, wild turkey, and several other species of gallinaceous birds occur in great numbers. Of the *grallatores* or waders we have the flamingo, several herons, the scarlet, white, and glossy ibis, the crane, the coot or mud hen, the rail, sandpiper, avocet, snipe, gray plover, &c. The *natatores* or swimmers are here a very numerous order. Of the *anserinæ* or geese there are about 20 species, including 2 species of swans; and of the *anatidæ* or duck family, at least 30. There are also 2 species of pelicans, confined to the gulf states, a great number of species of gulls, and half a dozen cormorants.—In reptiles the United States are less prolific than some other countries. There is a considerable variety of tortoises, though few of great size; and the keys or small coral islets along the coast of Florida, and the sandy spits along the shores of the southern Atlantic and gulf states, are frequented by the green and other sea turtles in great numbers. The alligator inhabits the rivers and bayous of the gulf states, and proves very destructive to cattle and small animals, sometimes, though rarely, attacking men. The saurians are abundant, especially in the southern states, and include a great variety of lizards (among others, the chameleon), skinks, horned frogs (*phrynosoma*), monitors or safeguards, &c. The ophidians or serpents are considerably numerous, but only 3 genera, the rattlesnakes, the moccason snakes, and the vipers, are venomous. The black snake (*coluber constrictor*) is the only boa in the United States. The batrachians embrace numerous species of frogs, tree frogs, a horned frog (*ceratophrys*), 2 or 3 species of toad, the proteus, siren, 3 or 4 tritons or newts, and about 20 species of salamander.—The number of genera and species of fish visiting or inhabiting the waters of the United States is too great to be fully enumerated. The most remarkable of the spine-finned are the pickerel, perch, mackerel, sword fish, and mullet. Among those with soft abdominal fins, the best known are the salmon, the shad, of which some varieties possess great excellence, the menhaden or alewife, the herring, pike, and carp; of those with soft fins at the throat, the cod, the fishery of which employs a very large force of men and furnishes food for many thousands, flounders, flat fish, &c.; and of fish without ventral fins, several species of eels, both fresh and salt water fish, and the lamprey. The shark, of which there are 16 or 18 species, the ray or skate, of which there are 30 or 40, and the devil fish, are the most formidable of the monsters of the deep on the American coasts. Other fish well known and highly prized for the table are the halibut, tautog, blue fish, sea and striped bass, tomcod, porgy, &c.; and from the rivers and lakes, the perch, roach, dace, brook trout, lake trout, giant pike or muscalonge, and the delicious white fish of the lakes. Of mollusks, the *acephala* are widely distributed on the sea coast and through the lakes and rivers. The oyster of numerous varieties attains a flavor and excellence unknown elsewhere; the soft-shelled clam (*mya arenaria*) and the quahaug or round clam (*Venus mercenaria*) are also much prized in some districts as articles of food. The pecten or scollop and the mussel are also edible species of bivalves. Others of the order are the cockle, hammer shell, razor shell, club shell, waterpot shell, and *teredo* or ship worm; and in the rivers the numerous species of *unio* and *anodonta*, usually called fresh water clams, are abundant. The pearl oyster has been found on the California coast, and several of the *unionidæ* secrete pearls of considerable value. There are many genera and species of land snails, and slugs, land soles, pond snails, limpets, whelks, ear shells, mitre shells, and others of the *gasteropoda;* and the Atlantic, Pacific, and gulf of Mexico wash upon our shores great numbers of the cephalopods which inhabit their waters, among them the nautilus, squid, *spirula*, sea spiders, &c. The *crustacea* are numerous, and many of them edible. Crabs, hermit crabs, lobsters, shrimps, horse-shoes or king crabs, &c., abound on the sea coast; and the fresh water lobster and land crab are found in the interior. The wood louse is common everywhere in damp places, and many of the parasitic insects belonging to this class are familiar to all. Of the *arachnida* there are in the gulf states some venomous species, as the scorpion and several species of spider; but for the most part the spiders, mites, &c., of the United States are harmless. The centipede, though properly belonging to the tropics, is occasionally found in the south-western states.—The insect tribes are too numerous to receive more than a passing notice. The beetles are very abundant, and include many genera. There are 22 species of locust, some of them destructive to vegetation, but none of them to be compared with the locust of oriental countries. The bee, wasp, hornet, and bumblebee, each of numerous species; the vast and beautiful tribe of butterflies; grasshoppers of many species and sometimes of great destructive power; the whole family of flies, among which, beside the house pests, we have a blistering fly nearly equal to the Spanish; and the other insect orders, all have their representatives; and as we approach the tropics their number and variety greatly increase. The *annelida* have many representatives in the numerous worms which infest the country, some of them destroying the foliage of the trees, others penetrating the wood, others still the roots of trees and esculent vegetables. The leech, which inhabits marshy ponds, though not equal in power to the Swedish leech, is yet formidable from the loss of blood it occasions to those who expose themselves to its attacks, and occasionally fastens in such numbers upon cattle as to cause their death.—The domestic animals of the United States have been, with one or two exceptions, introduced from Europe. The horse, though not native to this continent, became wild at an early period, and now roams in large herds in the plains of Texas, but is domesticated without great difficulty. There have been at different times stocks introduced from England, France, Spain, and some from Morocco and Arabia; much attention has been paid to the breeding of these animals, and some of them have not been surpassed in speed or other good points. The asses are mainly from Spain and Malta; the cattle from Great Britain; the goats from the south of Europe, though some efforts have been made to introduce Asiatic species; and the sheep from the Southdown, Saxon, and Spanish Merino breeds. The swine are of various stocks; one breed, common in central and western Virginia and other mountainous districts, is tall, long, and gaunt, of ferocious nature and uncertain origin; but the most common breeds are the Berkshire (English) and Chinese, and crosses upon these. Our domestic dogs and cats are with few exceptions of European origin. The brown or Norway rat was an importation from the country whose name it bears, but has now been nearly destroyed by a more powerful and ferocious black rat, said to be from the south of Europe. Efforts have been made, but with no very satisfactory result, to introduce the llama of South America in our mountainous districts. The attempt to acclimate the Bactrian camel in Texas and California gives greater promise of success.—The republic abounds in natural curiosities and other objects of interest to travellers. Immense numbers of persons annually resort to the mineral springs, prominent among which are Stafford Springs, Conn.; Saratoga Springs, Ballston Spa, Avon Springs, New Lebanon Springs, and Sharon Springs, N. Y.; Brandywine Springs, Del.; the Red, White, and Blue Sulphur Springs and Sweet Springs, Va.; Warm Springs, N. C.; Hot Springs, Ark.; and Harrodsburg and Drennon Springs, Ky. The White mountains and Monadnock mountain in New Hampshire; Mt. Katahdin in Maine; Mt. Tom, Mt. Holyoke, and Wachusett mountain in Massachusetts; the Catskills, Adirondacs, and Alleghanies in New York; Schooley's mountain in New Jersey; and Pilot mountain and Mitchell's peak in North Carolina, are noted for their striking or picturesque scenery; while the great mountain ranges of the Pacific slope present innumerable scenes of unsurpassed beauty and sublimity. Beside the great cataract of Niagara, there are several waterfalls worthy of particular notice, including the falls of the Connecticut at Bellows Falls, Vt.; Trenton Falls, in Oneida co., N. Y.; the falls of the Mohawk at Cohoes, N. Y., and of the Genesee at Rochester, N. Y.; the Katterskill falls on the Catskill mountains; the falls of the Passaic at Paterson, N. J.; of the Missouri in the N. W. part of Dacotah, the greatest on the continent after Niagara; St. Anthony's falls of the Mississippi, in Minnesota; and the 5 remarkable cascades in the Yosemite valley, Cal., one of which is said to be the highest known in the world. The most remarkable caves are the Mammoth cave in Kentucky; Madison's cave and Weir's cave, Virginia; Nicojack cave, Georgia; and Fountain cave, near St. Paul, Minnesota. Not the least interesting among the picturesque features of the country are the remarkable channels cut by some of the rivers through ranges of hills or rocky ridges. Such are the passage of the Hudson through the highlands of New York; the Delaware Water Gap; the passage of the Potomac through the Blue ridge at Harper's Ferry; the "gates of the Rocky mountains" on the upper course of the Missouri in Dacotah; the deep cañon of the Red river on the N. W. frontier of Texas; and the "cascades" where the Columbia river breaks through the Cascade range on the boundary between Washington territory and Oregon. The natural bridge of Virginia; the pictured rocks on the shore of Lake Superior in Michigan; and the popular seaside resorts, such as Nahant and Nantasket, Mass., Newport, R.I., Rockaway, N.Y., and Long Branch and Cape May, N. J., as well as nearly all the scenes above mentioned, are described in other articles. Among the most remarkable natural curiosities of the country must also be included the groves of enormous trees described in the article CALIFORNIA.—There is no other country in the world which contains a population composed of such heterogeneous elements as that of the United States. The character of the original settlers has left its impress to a certain extent upon their descendants, though in many parts of the country all such distinctive traces have been obliterated by the streams of subsequent immigration from all parts of Europe. In New England there is a strong remnant of the Puritan character; in Maryland the descendants of the English Roman Catholics, who came over with Cecil Calvert, are yet a prominent element of the population. New York obtained its first settlers from Holland, and in some remote villages of that state Dutch was not long ago the language of a considerable portion of the inhabitants. Delaware and New Jersey were first settled by the Dutch and Swedes; Pennsylvania by English Quakers, followed by many Germans, whose descendants form a numerous class of the population; North Carolina by nonconformists from Virginia. In South Carolina a large number of Huguenots found a home soon after its first settlement by whites. Louisiana, when purchased by the United States, was inhabited chiefly by French families. Texas and California are still to some extent Spanish, and the latter state contains 23,140 Chinese. The Mormons of Utah are mainly English, with a large admixture of native Americans, Welsh, Scandinavians, and other nationalities. In the other states the first settlers cannot be said to have transmitted any distinctive national traits to their descendants of the present day. In many parts of the newly settled north-west there is a large number of half-breeds or descendants of whites and Indians; but, beyond the perpetuation of numerous local names, the impress left upon the older and more thickly settled portions of the country by its aboriginal inhabitants is scarcely discernible. They have there nearly all disappeared, and the few that remain are chiefly gathered in small communities by themselves, more or less assimilated in modes of life to their white neighbors. In the extreme west they still form in many places the principal or sole population, and roam in all their primitive wildness. A few tribes, like the Apaches, Comanches, and Navajoes, are still openly or secretly hostile to the whites. In all cases where it has been practicable the Indians have been removed to "reservations" of land set apart for their use, and formerly secured in common to the tribe or part of a tribe which occupied them, according to their own system of land ownership. Since 1858, however, the plan has been adopted of granting titles in severalty to tracts of 40 to 80 acres to any Indians who would cultivate them, and among the more civilized tribes this has had a good effect. Whenever savage Indians can be induced to remove to reservations, the government pays them for the land they relinquish, and it has now invested for their benefit $3,396,241, the interest of which is regularly paid them. They also receive small annuities from the United States. A part of the Cherokees, Creeks, and Choctaws, settled in the Indian territory, have adopted the customs of civilization, and are in some sort distinct nations under the protection of the United States. Exclusive of these, the Indians have 241 farms (6,112 acres) in cultivation, and own horses, mules, cattle, farming implements, and other personal property to the value of $4,670,043. There are 77 missionaries and 162 schools among them, the latter having 5,950 pupils and 186 teachers. The management of Indian affairs is intrusted to a bureau of the department of the interior, under the charge of a commissioner. Negroes were introduced as slaves into all the colonies in their infancy, and the greater portion of those now in the country are still held as such in 15 of the 34 states, forming in some nearly or more than half the population. Their commingling with the dominant race has produced a numerous class of hybrids of all shades of complexion, known, according to their respective proportion of African blood, as samboes, mulattoes, quadroons, octoroons, &c. The amount and condition of the African element of the population (classed indiscriminately as slaves and free colored) are exhibited in tables II., III., IV., and V. Table VI. shows the number and places of nativity of the foreign-born inhabitants of the United States in 1850, and their distribution among the several states. The number of native-born inhabitants of foreign parentage is not so easily determined. The corresponding statistics for 1860, not being yet collated at the census office, cannot be given in the present article. (See EMIGRATION.)—The development of the agricultural resources of the United States has not kept pace with the increase of the population. This is owing partly to the extraordinary growth of commerce and manufactures, which in many cases has built up large cities at the expense of the rural districts, and partly to improper methods of cultivation. Many of the older cultivated districts do not yield at present half as much as formerly, and some not a quarter as much. The falling off is easily checked by a judicious rotation of crops, and an application of a few of the simplest principles of agricultural chemistry; and the great and constantly increasing attention which has been paid to the science of farming for some years past, is gradually giving to the United States a rank as one of the most carefully tilled countries in the world. (See AGRICULTURE.) The greatest wheat-producing state is Illinois, after which in order come Wisconsin, Indiana, Ohio, Virginia, Pennsylvania, New York, Iowa, and Michigan. There has been for some years past a continual falling off in the productiveness of the wheat fields in the older states. The true wheat soils of the republic are found in the Atlantic states, excluding New England and the extreme south; and though large quantities of the grain are produced in localities far distant from these, it is almost exclusively of the inferior kind known as spring wheat. The prairie states yield enormously when the ground is first broken, but the soil wears out even sooner than that of the Atlantic states. The wheat crop of Ohio has diminished in 50 years from an average of 30 bushels an acre to an average of less than 15. Many portions of New York which once produced 25 bushels an acre now barely average 5. An English traveller in 1775 was amazed to find that the land around Albany yielded 30 or 40 bushels an acre, even with the most imperfect husbandry, while in England (where the average crop is now 36 bushels an acre) the best managed lands did not yield half so much. The average yield in Albany co. in 1855 was 4.68 bushels of winter wheat and 7.38 of spring wheat. From 1840 to 1850 the increase in the wheat crop of the whole United States was only 15,662,672 bushels, nearly all of which was supplied by Michigan, Indiana, Illinois, Wiconsin, Iowa, and Missouri. There was a small increase in the middle states, Virginia, and the Carolinas, but in Kentucky, Tennessee, Ohio, and most of the other states, a very large decrease, showing that the old wheat regions were rapidly deteriorating. This is owing to the system of exhaustive cropping, the farmers preferring to work their land to its utmost capacity until it wears out, and then to remove westward, rather than to be at any expense for fertilizers or to practise a rotation of crops. From 1850 to 1860, however, the increase was 70,647,487 bushels, shared in different proportions by all the states except Maine, Vermont, New York, and Pennsylvania, which show a decrease. Ohio is almost stationary, with a very slight increase. Illinois stands first in the production of Indian corn, and next follow Missouri, Ohio, Indiana, Kentucky, Tennessee, Iowa, Virginia, Alabama, Georgia, North Carolina, and Mississippi. The greatest quantities of oats are raised in New York, Pennsylvania, Ohio, Illinois, Wisconsin, Virginia, Iowa, Indiana, Kentucky, New Jersey, Missouri, and Vermont; of rye, in Pennsylvania, New York, New Jersey, and Kentucky; of barley, in California, New York, Ohio, and Illinois; of buckwheat, in Pennsylvania, New York, and Ohio; of beans and peas, in Mississippi, North Carolina, Georgia, South Carolina, and New York; of orchard products, in New York, Ohio, Pennsylvania, and Indiana; of market garden products, in New York, New Jersey, Pennsylvania, and Massachusetts; of Irish potatoes, in New York (which produces more than any 3 other states), Pennsylvania, Ohio, Maine, Illinois, Michigan, Vermont, New Jersey, and New Hampshire; of sweet potatoes, in Georgia, North Carolina, Alabama, Mississippi, Tennessee, Louisiana, and Virginia; of hay, in New York, Pennsylvania, Illinois, Ohio, Maine, Vermont, and Wisconsin; of butter, in New York (which produces nearly twice as much as any other state), Pennsylvania, Ohio, Illinois, Indiana, Vermont, Michigan, Wisconsin, Virginia, and Missouri; of cheese, in New York (which produces more than twice as much as any other state), Ohio, Vermont, and Massachusetts; of rice, in South Carolina and Georgia; of wool, in Ohio, New York, Pennsylvania, and Michigan; of live stock, in New York, Ohio, Illinois, Pennsylvania, Kentucky, Tennessee, Missouri, Texas, and Indiana; of tobacco, in Virginia, Kentucky, Tennessee, Maryland, North Carolina, Missouri, and Ohio; of maple sugar, in New York, Vermont, Ohio, Michigan, and Pennsylvania. Cane sugar is grown largely in Louisiana, and to but little extent elsewhere. The only states that produce much flax are New York and Kentucky; and the only ones in which much hemp is grown are Kentucky, New York, and Missouri. New York is the principal seat of the hop culture. Wine is produced chiefly in Ohio, California, and Kentucky. The best cotton, the famous sea island variety, is raised in South Carolina, Georgia, and Florida. The greatest number of bales are produced in Mississippi, Alabama, Louisiana, Georgia, Texas, and Arkansas, and the plant has also been cultivated with success in Illinois. In general it may be said that the middle and western states are most productive in wheat, rye, and oats; the southern and western in Indian corn; and the southern in rice. Wool and Irish potatoes are raised mostly N. of lat. 34°; tobacco between 34° and 41°; sweet potatoes S. of 40°; barley, apples, and pears N. of 38°; peaches S. of 41°; hemp, flax, and hops N. of 34°; cane sugar, oranges, figs, bananas, &c., S. of 33°.—In 1850 the number of farms in all the states and territories was 1,449,075, embracing 113,032,614 acres of improved, and 180,528,000 of unimproved land (in 1860, 163,261,389 acres improved, and 244,508,244 unimproved). The unimproved land consists of land that is occupied and necessary to the enjoyment of the improved, though not itself reclaimed; it does not include meadow. The value of farms was $3,271,575,426 (1860, $6,650,872,507), and of farming implements and machinery $151,587,638 (1860, $247,027,496); total, $3,423,163,064 (1860, $6,897,900,003); average value of farms, $2,228; average value of farming implements and machinery, $105; average value of farms, implements, and machinery, $2,362. The average size of farms was 203 acres, the greatest average being in California (4,466 acres), and the smallest in Utah (51 acres). The greatest aggregate values of farms ($554,546,642; in 1860, $803,343,593), and of farming implements and machinery ($22,084,926; in 1860, $29,166,695) were in New York. The greatest average values of farms were in the District of Columbia ($6,481), Louisiana ($5,648), and New Jersey ($5,030); and the smallest average values in Utah ($337), New Mexico ($441), and Arkansas ($860). The average value of implements and machinery was greatest in Louisiana ($863), where complicated processes are required for the production of sugar, and least in New Mexico ($21), the next to the highest average being in New Jersey ($185), and the next to the lowest in Maine ($49). In the same year about $\frac{1}{13}$ of the whole area of the states and territories was improved, and $\frac{1}{8}$ more occupied but not improved, leaving about $\frac{4}{5}$ of the entire area unoccupied. The improved lands comprised in New England 26.79 per cent. of the whole; in the middle states 35.72 per cent.; in the southern states 16.07 per cent.; in the south-western states, exclusive of Texas, 10.17 per cent.; in the north-western states 12.90 per cent.; in California and the organized territories .06 per cent.; and in Texas .42 per cent. The average value of land per acre in New England was $20.27; in the middle states $28.07; in the southern states $5.34; in the south-western states $6.26; in the north-western states $11.89; in California and the organized territories $1.89; in Texas $1.44. The proportion of improved land to the whole in the free states was 14.72 per cent.; in the slave states 10.09 per cent.; in the United States 7.71 per cent. The proportion of occupied land to the whole in the free states was 28.56 per cent.; in the slave states 33.17 per cent.; in the United States 20.02 per cent. The average value of occupied land per acre in the free states was $19; in the slave states $6.09; in the United States $11.14. The number of acres devoted to the different crops were: hay and pasturage, 33,000,000; Indian corn, 31,000,000; wheat, 11,000,000; oats, 7,500,000; cotton, 5,000,000; rye, 1,200,000; peas and beans, 1,000,000; Irish potatoes, 1,000,000; sweet potatoes, 750,000; buckwheat, 600,000; tobacco, 400,000; sugar, 400,000; barley, 300,000; rice, 175,000; hemp, 110,000; flax, 100,000; orchards, 500,000; gardens, 500,000; vineyards, 250,000; miscellaneous, 1,000,000. These figures leave 17,247,614 acres of land returned as improved unaccounted for. The largest average crop per acre of wheat was in Massachusetts, 16 bushels; the smallest in Georgia, 5 bushels; of rye, largest, Ohio, 25 bushels; smallest, Virginia, 5 bushels; of Indian corn, largest, Connecticut, 40 bushels; smallest, South Carolina, 11 bushels; of oats, largest, Iowa, 36 bushels; smallest, North Carolina, 10 bushels; of rice, Florida, 1,850 lbs., South Carolina, 1,750 lbs., Louisiana, 1,400 lbs.; of tobacco, largest, Missouri, 775 lbs.; of seed cotton, largest, Texas, 750 lbs.; of Irish potatoes, largest, Texas, 250 bushels; smallest, Alabama, 60 bushels; of sweet potatoes, largest, Georgia, 400 bushels. Of the whole number of 74,031 cotton plantations in the southern states on which 5 bales and upward were raised during the previous year, 16,100 were in Alabama, 15,110 in Mississippi, 14,578 in Georgia, 11,522 in South Carolina, 4,205 in Louisiana, 4,043 in Tennessee, 2,827 in North Carolina, 2,262 in Texas, 2,175 in Arkansas, 990 in Florida, 198 in Virginia, and 21 in Kentucky. Of 2,681 sugar plantations, 1,558 were in Louisiana, 958 in Florida, and 165 in Texas. Of 551 rice plantations on which 20,000 lbs. and upward of rough rice were produced, 446 were in South Carolina, 80 in Georgia, and 25 in North Carolina. Of 15,745 tobacco plantations on which 3,000 lbs. and upward of tobacco were raised, 5,987 were in Kentucky, 5,817 in Virginia, 2,215 in Tennessee, and 1,726 in Maryland. A detailed statement of the total agricultural production of the United States, as returned by the censuses of 1850 and 1860, is given in tables IX. and X.—The manufacturing industry of the United States dates from a period prior to their existence as an independent nation. Among the exports of the New England colonies and New York, until the English government forbade the sale of their manufactured products abroad from the fear of its competition with her home industries, were products of the loom, the forge, and the anvil, wrought with creditable skill, amid the most discouraging difficulties from the want of capital and machinery. The manufacture of iron was conducted on a large scale for many years before the revolution in Plymouth co., Mass., at Salisbury, Conn., near Cold Spring on the Hudson, at Valley Forge, Penn., at Durham, below Easton, Penn., and at some other places. The necessity of iron for so many uses stimulated its manufacture after the colonies became independent; and though it was largely imported from Europe, the combination of skill and capital, and the known existence of superior ores, making the production of some qualities easier and cheaper there than here, there was a healthy and satisfactory growth in the production with each successive decade. In 1830 there were 239 furnaces, making 191,536 tons, which was converted into 112,866 tons of bar iron and 28,273 tons of cast iron; the whole having an aggregate value of $13,329,760, and employing 29,254 hands. In 1837 it had risen to 250,000 tons. In 1850 the census report gave the production of pig iron as 563,755 tons, which was undoubtedly below the truth, as the local statistics of Pennsylvania alone the same year gave the number of tons produced as 564,575. The census of 1850 also reported as employed in the various branches of iron production and manufacture 60,285 persons, and aggregate products of over $50,000,000. In 1856 the total production of iron had risen to 841,550 tons, of which 812,917 tons were pig iron. There was also imported the same year 488,998 tons of crude iron, making the whole amount used 1,330,548 tons. The manufacture of the domestic iron that year yielded products valued at $47,771,236. The discovery of extensive deposits of very superior ore would have increased the production to a much greater extent, but for the competition of inferior qualities of foreign, which were admitted under a low duty. The pig iron produced during the census year ending June 1, 1860, is stated at 902,316 tons, valued at $46,117,550; and 395,536 tons of rolled iron were produced, of the value of $21,710,681; making the aggregate value of pig and rolled iron produced that year $67,828,231. The pig iron is largely consumed by the manufacturers of stoves and hollow ware, which are produced in the United States in larger quantities than in any other country in the world.—The cotton manufacture was commenced in this country in 1790, although there had been some home manufacture of cotton goods prior to that time. In 1815 about $40,000,000 of capital was invested in the business, 90,000 bales of 300 lbs. each consumed, 81,000,000 yards of cotton cloth produced, and nearly 100,000 operatives employed in its various processes. The progress of the manufacture had however been impeded by the large quantities of English cotton goods imported annually from Great Britain, where the invention of the power loom had cheapened the cost of production. The invention of a power loom in this country by Messrs. Sewell and Jackson, and its successful operation at Waltham in 1813, obviated in part this difficulty, and in 1822 the first cotton mill at Lowell was erected. The tariffs of 1824, 1828, and

1832 protected the manufacturers, and the production of cotton goods increased with great rapidity, while their price greatly decreased. In 1831 the number of cotton mills was 795, with 1,246,503 spindles and 33,506 looms, producing annually 230,461,990 yards of cloth, consuming 77,757,316 lbs. or 214,882 bales of cotton, and employing 18,539 men, 38,927 women, and 4,691 children; the annual value of manufactured articles was $26,000,000, and the quantity of cotton goods printed was estimated at 40,000,000 yards. At this time there were no cotton mills south of Delaware. In 1840 there were 1,240 mills, with 2,284,631 spindles, and consuming 132,835,856 lbs. or 332,089 bales of cotton. The protective tariff of 1842 stimulated the business by checking importations, which however were again very large under the low tariff of 1846; yet in 1850, although the number of factories was reduced to 1,074, their total capacity was greatly increased, 641,240 bales of cotton of 400 lbs. each being consumed, and $65,501,687 worth of goods produced. Of these manufactories, 213 were in the southern and western, and the remainder in the eastern and middle states. The tendency of the last decade was still further to the consolidation of this manufacture in a comparatively small number of establishments with large resources, but the production still continued to increase, and had reached in 1860 the amount of $115,237,926; of the 915 manufactories, 192 were in the southern and western states. The scarcity and high price of cotton and the general depression of business consequent upon the civil war have since that date temporarily diminished the amount of production.—The woollen manufacture was carried on as a branch of home industry almost from the foundation of the colonies, but was not conducted in large establishments to any considerable extent till after 1810. In the census report of 1810, the value of woollen goods, almost entirely produced in families, was stated at $25,608,788. In 1820 the large manufactories only were reported, and the production was $4,413,068. In 1830 it had risen to $14,528,166. In 1840 the amount of capital invested was $15,765,124, the quantity of wool used 50,808,524 lbs., the number of persons employed 21,342, and the value of the manufactured products $20,696,699. In 1850 the manufacturers of broadcloths had learned the art of dyeing them with fast colors, and this branch of the manufacture had received a very considerable impulse; the power carpet loom had also been invented, and our manufacturers were able to produce carpets equal in quality and superior in durability to the English. The number of manufacturing establishments in that year was 2,447, the capital invested $26,811,467; 70,862,829 lbs. of wool were used, and the value of products was $41,588,033. These totals do not include manufactures in which cotton and wool were combined. In 1860, as in the cotton manufacture, the number of establishments had been reduced by consolidation, being 638 less than in 1850; but the amount of capital invested in the business had risen to $35,520,527, the quantity of wool used to 80,386,572 lbs., to which were added 16,008,625 lbs. of cotton for the mixed goods, and the value of the product to $68,865,963. —The manufacture of leather was commenced very soon after the settlement of the colonies, being one of the class of manufactures well adapted to new settlements; and its progress has been steady and constant to the present time. The large tanneries have usually been situated in districts where the hemlock and oak abounded, for the sake of obtaining the bark, used in tanning without too much expense of transportation. In 1850 there were 6,528 tanning and currying establishments in the United States, employing 22,575 persons; the capital invested was $20,602,945, and the value of the leather produced $37,702,333. The returns of 1860 are as yet incomplete, but the production of leather is stated at $63,091,051. Almost the whole of this amount is consumed at home, the exports of leather in 1860 being only $674,809. The manufactures of leather in 1850 were: boots and shoes, $53,967,408; gloves, $708,184; leather belting, $105,500; morocco, $3,861,895; patent leather, $1,368,309; saddles and harness, $9,935,474; total, $69,946,761. The returns of these branches of manufacture for 1860 are not yet collated, but the increase in the production of boots and shoes, patent leather, leather belting, and saddles and harness is known to have been very large. The states which in 1850 produced the largest quantity of leather, each of them exceeding $1,000,000, were Maine, Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Kentucky, and Ohio. In 1860 the states of Maine, New Hampshire, Vermont, Massachusetts, New York, Pennsylvania, New Jersey, Maryland, Virginia, Tennessee, and Ohio, each produced leather to the value of more than $1,000,000; and Massachusetts, New York, and Pennsylvania had each more than doubled their production of 1850. The states of Massachusetts, New York, and Pennsylvania alone produced more than two thirds of the whole amount. In 1850 Massachusetts was the largest producer of boots and shoes, manufacturing almost half the entire amount; the other states manufacturing over $1,000,000 each were New Hampshire, Connecticut, New York, New Jersey, Pennsylvania, Maryland, and Ohio; and these states together produced about $\frac{9}{10}$ of the whole amount. The agricultural implements manufactured in the United States in 1850 were valued at $6,842,610; in 1860, at $17,802,514. In 1850 only one state (New York) manufactured more than $1,000,000 worth of them, and only five, viz., Massachusetts, New York, Pennsylvania, Ohio, and Illinois, over $500,000. In 1860 New York manufactured $3,429,037; Ohio and Illinois each exceeded $2,500,000, Massachusetts and Pennsylvania each

$1,500,000; and Kentucky, Alabama, Wisconsin, and Indiana produced to the value of over half a million dollars each. Steam engines and machinery were produced in 1860 to the value of $46,117,550; New York, Pennsylvania, Massachusetts, Ohio, New Jersey, Maryland, Virginia, Kentucky, California, Connecticut, and Rhode Island being the largest producers. The manufacture of flour in 1850 amounted to $136,056,736 in value, employing 23,310 persons and a capital of $54,415,581; and in 1860 the value had increased to nearly $221,000,000. The production of lumber, which in 1850 was $58,520,966, had increased in 1860 to $93,651,000. The following branches of manufacture, which in 1850 produced the annexed amounts, have also greatly increased: bakers, $13,294,229; blacksmiths, $16,048,536; cabinet ware, $17,663,054; calico printing, $13,680,805; tallow chandlery, $10,199,730; clothiers and tailors, $48,311,709; coaches and carriages, $11,078,630; distilleries, $15,770,240; hats and caps, $14,319,864; India rubber goods, $3,024,335; firearms, $1,173,014; musical instruments, $2,580,715; nails, $7,662,144; paper, $10,187,177; pork and beef packing, $11,981,642; printing and publishing, $11,586,549; ship and boat building, $16,595,688; quarry products, $8,180,115; stoves and ranges, $6,124,748; sugar refining, $9,898,800; tin and sheet iron works, $8,938,188; tobacconists, $13,491,147; white lead, $5,242,213. The manufactures of plated ware, sewing machines, mowers and reapers, petroleum oils, gutta percha goods, shirts, &c., which do not appear in the returns of 1850, have attained a sufficient magnitude to merit a prominent position among the manufactures of 1860. In the annexed tables of manufactures (XI. and XII.) the statistics for 1860 are in many cases given in round numbers, the returns not having yet been fully revised, but are believed to be a near approximation to the actual results. The manufacturing statistics of the census of 1850 have never appeared in full; our statements for that year are taken from the "Abstract of the Statistics of Manufactures, according to the Returns of the Seventh Census," published by order of congress in 1859, except the quantities of goods produced, not found there, which are from the imperfect "Compendium of the Seventh Census," published in 1854. —The commerce of the colonies which afterward formed the United States early attained a considerable magnitude. In 1700 the exports of New England, New York, Pennsylvania, Virginia, Maryland, and Carolina amounted to about £395,000, and their imports to £344,000. In 1750 the exports of these colonies had risen to £813,000 and their imports to £1,312,000. In 1775 the exports were £1,920,000, while the imports, which in the previous year (1774) were £2,692,000, fell off under the prospect of the coming war to £196,000, and in 1776 to £55,400. During the war, and until the adoption of the constitution, trade languished, and commerce was to a considerable extent suspended, owing to the jealousies of foreign states and the rivalry of the several members of the confederation. After the reorganization of the government under the constitution in 1789, it speedily attained respectable proportions. The tonnage, which in 1792 was 564,437, in 1801 had increased to 1,033,219; the imports, which in 1792 were $31,500,000, in 1801 were $111,363,511; and the exports had risen during the same period from $20,753,098 to $94,115,925. In 1807 the tonnage was 1,268,548, the imports $138,500,000, and the exports $108,343,150. At this point American commerce received a blow from which it did not recover for years; the "orders in council" of the British parliament, followed as they were by the "Berlin and Milan decrees" of Napoleon, and by our own embargo act in 1807, produced a terrible stagnation in our commerce; and though the amount of tonnage did not vary materially for the next 15 years, the imports fell off in 1808 to $56,990,000 and the exports to $22,430,960. The war of 1812–'15 furnished employment to some of the vessels which would otherwise have rotted at their wharfs, and led to the building of some war vessels and fast-sailing privateers; but the commerce of the country continued to decline till in 1814 it had fallen to $12,965,000 imports and $6,927,441 exports. The close of the war gave an extraordinary impulse to trade, and in 1815 the imports reached $113,041,274, while in 1816 they rose to $147,103,000; the exports of these two years were $52,557,753 and $81,920,452. From this amount of importation, which was excessive for the wants of the country at the time, there was a falling off the next year to $99,250,000; and from that period to 1830, with the exception of 1818, the average of imports did not exceed $78,000,000, and the exports were of about the same amount. From 1831 to 1837, the imports and exports rapidly increased, the former being $189,980,035 in 1836, and the latter $128,663,040. The revulsion of 1837, and the combined results of the bankrupt law, the change in the tariff, and the secondary effects of the great financial panic, reduced both imports and exports, which touched their lowest point in 1842. From that date the increase was gradual at first, but more rapid in the later years, up to 1860, when the exports were $400,122,296, and the imports $362,163,941. In 1858 there was indeed a considerable decline in consequence of the financial crisis of the previous year, but in 1859 and 1860 the deficiency was more than made up. The civil war in 1861 reduced both imports and exports far below the standards of the previous years. The principal exports of that year were as follows: products of the sea, including oils, whalebone, spermaceti, and fish dried, smoked, and pickled, $4,451,515; products of the forest, including timber, lumber, shingles, staves, oak and other bark, tar, pitch, turpentine, resin, ashes, ginseng, skins, and furs, $10,260,-

809; products of agriculture, beef, tallow, hides, horned cattle, butter, cheese, pork, bacon, lard, wool, domestic animals, the cereals, potatoes, apples, onions, rice, cotton (only $34,051,483), tobacco, hemp, clover and flax seed, brown sugar, and hops, $149,492,026; manufactures, $38,256,115; coal, $577,386; ice, $172,263; gold and silver coin and bullion, $23,799,870; quicksilver, $631,450; articles not enumerated, manufactured, $2,530,689; raw produce, $2,794,046. The total exports of articles of American production amounted to $228,699,486; of foreign articles, $20,645,427; aggregate exports, $249,344,913. The imports were reported under the tariff of 1857 till April 1, 1861, and after that date under the tariff of March 2, 1861, forming thus two separate schedules of great length; the whole amount was $335,650,153. The most important items were: coffee, $20,561,981; tea, $6,832,039; gold and silver coin and bullion, $46,339,608; copper in various forms, $2,311,000; linseed, $2,073,750; raw silk, $1,411,000; unmanufactured wool, $4,563,100; cotton goods, $24,965,831; silk goods, $23,715,729; linen goods, $8,006,211; woollen goods, $26,828,350; iron and steel manufactured and crude, $16,468,008; sugar and molasses, $34,778,649. Tables XIII. to XXVI. give detailed statistics of the imports and exports, tonnage, &c., of the United States for various periods. In 1854 a treaty was entered into between the United States and Great Britain for the reciprocal admission, free of duty, into the former and the provinces of Canada, New Brunswick, Nova Scotia, Prince Edward's Island, and Newfoundland, with the consent of their several legislative bodies, of certain specified articles, being the leading productions of those countries; the treaty to continue in force 10 years, and afterward until 12 months after notice given by either party of a desire to abrogate it. This treaty has greatly increased the commerce of the provinces, and opened greater facilities for bringing western produce to market. Table XXI. gives a general view of its operation.—The government early constructed several excellent macadamized roads, among which were the great national road from Baltimore through Wheeling, Cincinnati, &c., to St. Louis, and that from Bangor to Hamilton, Maine. The rapid extension of the system of railroads has rendered the further construction of these highways unnecessary; and during the year 1862 the question of the construction of some lines of railroad as military roads for government purposes was discussed, but it has not yet been attempted. An act was passed by congress, however, during the session of 1861-'2, to aid in the construction of a railroad to the Pacific. The progress of railroad construction in the United States within the past 30 years has been unexampled in its rapidity. In 1832 there were 131 miles in actual operation. From 1832 to 1842, 3,746 miles additional were constructed; from 1842 to 1852, 7,001 miles; and from 1852 to 1862, 22,320 miles. The present extent and cost of railroads in the United States are shown in the following table:

States.	Jan. 1, 1852.	Jan. 1, 1862.		
	Miles open.	Miles open and under construction.	Miles open for traffic.	Cost of road and equipment.
Maine	283	639.78	449.56	$16,901,062
New Hampshire.	463	684.29	657.88	22,676,334
Vermont	369	575.67	555.07	22,586,766
Massachusetts	1,058	1,880.01	1,257.73	58,091,457
Rhode Island	50	136.82	104.32	4,475,498
Connecticut	570	751.90	616.76	22,519,448
New York	1,751	3,302.17	2,768.52	131,142,148
New Jersey	290	809.26	682.28	30,130,535
Pennsylvania	1,826	3,598.65	2,918.46	147,748,990
Delaware	16	157.00	136.50	4,347,337
Maryland	355	528.80	445.80	22,414,966
Virginia	443	2,316.98	1,729.20	66,750,158
North Carolina	249	1,287.42	943.30	17,887,395
South Carolina	283	1,016.93	966.93	21,900,909
Georgia	665	1,603.16	1,419.15	26,542,595
Florida	21	586.50	401.50	8,626,900
Alabama	113	1,434.70	743.16	19,851,097
Mississippi	65	1,072.12	867.12	23,006,000
Louisiana	117	838.00	338.75	12,230,000
Texas	..	2,687.00	402.50	14,431,365
Arkansas	..	704.33	38.50	2,800,000
Tennessee	134	1,403.49	1,253.28	32,299,982
Kentucky	98	859.90	531.20	13,875,348
Ohio	890	5,094.00	4,232.00	118,380,158
Michigan	474	1,404.15	799.30	32,396,370
Indiana	538	2,437.17	2,169.17	72,391,325
Illinois	271	3,849.70	3,041.20	113,542,454
Wisconsin	20	2,223.09	922.09	33,630,938
Minnesota	..	1,167.50	6.60	2,000,000
Iowa	..	2,086.80	892.15	21,382,557
Missouri	..	1,626.60	898.45	43,909,325
Kansas	..	1,000.00	10.00	250,000
California	..	348.23	70.05	3,000,000
Oregon	..	3.80	3.80	50,000
Total	10,900	51,114.92	33,222.37	$1,192,409,486

In the article CANAL will be found a table of the canals of the United States, with their length, cost, cost per mile, width, depth, size of locks, and tonnage of boats which they will admit. There were at that time (1858) 3,188¼ miles of canals completed, and the entire cost somewhat exceeded $90,000,000. Since that date the enlargement of the Erie and Champlain canals in New York has been completed, the Virginia canals extended, and the Illinois enlarged. The total expenditure up to the present time is not less than $100,000,000. A project was discussed in congress in 1862 for enlarging the Erie, Champlain, and Illinois and Michigan canals at the expense of the national government, so as to admit the passage of gunboats from the Hudson and the Mississippi to the great lakes. It was finally postponed to the next session. The length of magnetic telegraph lines in the United States in 1862 was between 50,000 and 60,000 miles, and includes a line extending across the continent to San Francisco, Cal., and Portland, Oregon; while active measures are in progress to connect this with one from St. Petersburg to the mouth of the Amoor, which will give us an uninterrupted communication with Europe through Asia. (See TELEGRAPH.)—The public institutions of the United States of a benevolent, charitable, literary, or scientific character are numerous, but are mostly organized under state charters and described under the several states. Among the few which are strictly national in character, are the Smithsonian institution, founded at Washington in 1846 under the bequest of James Smithson; the national observatory, also at Washington, for the promotion of astronomical and meteorological science; and the "American Association for the Advancement of Science," a convention of the cultivators and friends of physical and mathematical science, which holds annual or semi-annual sessions in different cities, and publishes annual volumes of "Transactions." There are also many national associations for the advancement of education, religion, benevolent purposes, and different branches of the arts and sciences.—Education in the United States is very generally diffused. The number of native inhabitants of the New England states who cannot at least read and write is very small. In the middle states the large influx of foreign population, a considerable proportion of whom are indifferent to the education of their children, has made the proportion of uneducated persons somewhat greater. In the southern or planting states, the population is too widely scattered to admit of successful public schools except in the cities, and the larger part of the non-slaveholding whites have had but few opportunities of education; while in most of these states it is by local law a penal offence to teach the negroes to read. In the western states ample provision is made for elementary education. In all the new states one, and in some of them two sections of land (each of 640 acres) in each township of government lands are reserved for school purposes, and the states have also grants of swamp and other lands for school funds and for the establishment of state universities. The people generally appreciate the advantages of this elementary education, and great sacrifices are often made to establish and maintain good and accessible schools. That these schools, even in those states which are furthest advanced, are as efficient or thorough in their instruction as they should be, is not probable; but they have made very great improvement within the past 20 years, and are still advancing. In what is sometimes styled secondary education, embracing a very wide range, from the select school or village academy, which is often mainly occupied with rudimentary studies, to the high school, institute, seminary, or collegiate school (so called), the number of schools is in the older states sufficiently large, though in many of them the instruction might be improved. In several of the northern states the tendency is to the organization of graded schools, the public schools of a town or village being arranged so as to have one or more high schools, equal in their course of instruction and teaching to the best academies, three, four, or more grammar schools, and a still larger number of intermediate and primary schools, all supported by tax on property and the allowance from the school fund. The pupil, entering the primary school at 5 or 6 years of age, may pass by successive examinations to the highest department; and there being no charge for tuition, the child of the poorest citizen enjoys the same opportunities of education, up to the completion of the high school course, as the child of the rich. In some of the states this system is carried still further by the organization of free state universities. The greater part of the secondary instruction is, however, imparted in incorporated or private seminaries, academies, institutes, or collegiate schools, the price of tuition varying with the location, reputation, number of teachers, &c. In many of these the pupils board and lodge either in the family of the principal or in a boarding house connected with the school. Most of these schools are well conducted, and impart a very thorough and judicious course of instruction. The number of colleges in the United States in 1861 was about 130. They differ greatly in the extent and thoroughness of their course of instruction, some being little more than academies giving an elementary course in mathematics and classics, while others are nearly equal to the best classical schools of Europe in their requirements. A few are universities, having connected with them departments for professional or scientific study, well supplied with the means of imparting instruction in law, medicine, theology, physical science, mathematics, &c. Several of the states have state universities, or institutions bearing that name, though not yet fully organized, but there is no national university. Most of the colleges, including some of the best, were founded and are maintained mainly by particular religious denominations. There are nearly 60 theological schools and seminaries, of which 20 are connected with colleges or universities and the remainder independent; about 24 law schools, of which 16 are connected with colleges or universities; about 50 medical schools, of which nearly one half are departments of universities or colleges; 10 or 12 scientific schools, of which only 3 are as yet connected with universities, viz.: the Lawrence scientific school, at Cambridge, Mass., with Harvard university; the Sheffield scientific school, at New Haven, Conn., with Yale college; and the Chandler scientific school, at Hanover, N. H., with Dartmouth college. One has also been projected in connection with Union college, Schenectady, N. Y. The following statistics and estimates of the number of pupils and cost of instruction in private schools, high schools, academies, and boarding schools, and the results of the latest returns of colleges and schools of higher instruction, will give an approximate idea of the magnitude of the educational interest in the United States. The estimates of the number, attendance, and expense of the private schools and schools of higher grade are deduced from a careful examination of the published returns from 8 widely separated states, and are believed to be below the truth:

Institutions.	Number.	No. of pupils.	Annual expenditure per pupil.	Total expenditures.
Private schools, high schools, and academies.	17,000	510,000	$15*	$7,650,000
Boarding schools........	1,150	57,500	150	8,625,000
Colleges................	130	15,218	161	2,449,298
Theological institutions..	58	1,879	130	244,270
Law schools.............	23	1,409	200	281,800
Medical schools.........	45	5,430	200	1,066,000
Institutions for blind, deaf and dumb, and idiots..	50	7,517	150	1,127,550
Scientific schools not connected with colleges...	20	1,258	200	241,600
Total................	18,476	600,206	.....	$21,705,518
Add expenditure for common schools..........				21,185,624
Aggregate annual expenditure for educational purposes......................................				$42,891,140

Table XXXI. gives the statistics of colleges, academies, and common schools, as returned by the census of 1850; and table XXX. the statistics of common school education for 1860, derived from other sources, the census returns for that year not being yet available. In the other accessories of superior education, such as libraries, popular and scientific courses of lectures, scientific journals, &c., the United States, though necessarily far behind the older states of Europe, have made great progress within a few years past. There are 8 public libraries containing more than 100,000 volumes each, 10 containing over 50,000 volumes, and 20 containing over 30,000. There are no lecture foundations or endowments in the country, except that of the Lowell institute in Boston, the Graham lectures in Brooklyn, N. Y., and the Smithsonian course in connection with the Smithsonian institution at Washington; but in almost every city or large village courses of lectures, some of them scientific, others popular and amusing, are delivered every year, and attended by large numbers. The scientific journals receive no assistance, like many of the European scientific publications, from the government; they are ably conducted and well supported, and some of them have a high reputation in Europe as well as at home.—The press exerts a more powerful influence in the United States than in any other country; the greater part of the people read, and most families take at least one newspaper, and many take several, beside magazines. The leading journals, daily or weekly, political, literary, or religious, having a large circulation, and a consequently large advertising patronage (if, as is usually the case, they admit advertisements), can be afforded at a low price and still expend liberal sums in the remuneration of editors, reporters, contributors, and correspondents; and the result is seen in the high literary character of many of them. The religious newspaper press of the large cities is superior to that of any other country, both in its literary merits and its dignity of tone. There is also a local newspaper press, which exerts in the aggregate a powerful influence. There are few villages of 1,000 inhabitants in the country which do not support a local newspaper, edited it may be in general with no great ability, yet sufficing for the expression of local sentiments, for the development of local talent, and occasionally forming the mouthpiece of some vigorous and cultivated intellect which seeks through it to address the community it represents. The number of newspapers in 1850 was 2,526; in 1860, 3,951. Even the most newly settled states have a greater number than would be supposed possible, California having 99 in 1859, and Texas 86 in 1860. Table XXXIV. shows the number, character, and circulation of the newspapers and periodicals of the United States in 1850 and 1860.—There is no established or state church in the United States. The most numerous denomination, as appears in the tables, is the Roman Catholic, the membership of which, unlike the Protestant denominations, includes nearly the whole population attending upon its worship. It has some churches in every state, but is found chiefly in New York, Pennsylvania, Ohio, Maryland, Kentucky, Louisiana, Missouri, Indiana, Massachusetts, Iowa, Wisconsin, New Mexico, and California. But a small proportion of the Roman Catholics, however, are of American parentage, most of them being Irish, French, and German immigrants, and their immediate descendants. The next in numbers are the Methodists, who are divided into several bodies, holding in general nearly the same doctrines, but differing either in their views on the subject of slavery, or in their ideas of church government, lay representation, itinerancy, &c. There is a small number of churches, some of them composed mostly of Welsh and their descendants, which, while holding Calvinistic doctrines, adhere to the Methodist church polity, and are known as Calvinistic or Congregational Methodists. The Methodists are the leading denomination in the middle, southern, south-western, and western states, and perhaps also in the Pacific states and the territories; and in New England they occupy either the second or third rank. The Baptists are next to the Methodists in numbers, and they too are divided into several denominations. The regular or restricted communion Baptists are by far the most numerous, and occupy the second rank in numbers in the southern, south-western, and western states, and perhaps also in New England. The Freewill Baptists are confined to the northern and north-western states, and are most numerous in Maine, New Hampshire, Michigan, Wisconsin, and Iowa. The Seventh Day Baptists and the Six Principle Baptists are mostly confined to Rhode Island, Connecticut, and New York. The Church of God, or Winebrennarians, differ but slightly from the regular Baptists; they are found principally in Pennsylvania. The Mennonites are confined almost exclusively to Pennsylvania, Ohio, Virginia, and New York. The

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* For tuition only.

Dunkers or Tunkers are found in the same states. The "Disciples," or followers of Alexander Campbell, also practise immersion, but are not usually reckoned among the Baptists; they are found mostly in Virginia, Kentucky, Ohio, Pennsylvania, Indiana, Illinois, and Tennessee. The Presbyterian bodies come next in numbers. The largest and wealthiest is the Old School Presbyterian church, which has its largest membership in the middle, southern, and south-western states. The New School Presbyterians are found chiefly in the middle and western states, and the Cumberland Presbyterians in the south-western states. The Protestant Reformed Dutch church flourishes principally in New York and New Jersey; the German Reformed church in Pennsylvania, Maryland, North Carolina, and Ohio; and the Lutherans, consisting mostly of German, Swedish, and Danish immigrants, in Pennsylvania, Ohio, New York, North Carolina, South Carolina, Virginia, Maryland, Indiana, Illinois, Missouri, and Wisconsin. The Protestant Episcopal church, though having a smaller number of communicants than most of those previously mentioned, is a prominent and influential denomination. In New York, Philadelphia, and perhaps some other of our larger cities, its congregations are more wealthy than those of any other denomination. Before the revolution it was the established church of New York and Virginia; and it is still one of the leading denominations in those states, as well as in Maryland, Connecticut, and Pennsylvania. The Congregationalists are divided into two bodies, the Orthodox or Trinitarian and the Unitarian Congregationalists. The former are the leading denomination in the New England states, and have a considerable number of churches in New York and in each of the western and Pacific states, but very few in the other middle or the southern or south-western states. The Unitarian Congregationalists are most numerous in Massachusetts, but have some congregations, mostly in the cities and larger towns, in Maine, New Hampshire, Vermont, Connecticut, New York, the District of Columbia, Maryland, Virginia, South Carolina, Alabama, Louisiana, Missouri, and California. The denomination taking the distinctive name of Christians, having their largest numbers in Tennessee, Kentucky, Ohio, Indiana, Missouri, and New York, but found in nearly all the other states, may be described as Unitarian Baptists, with a church government somewhat resembling that of the Methodists. The Universalists are mostly in the New England states, New York, Pennsylvania, Kentucky, Ohio, Michigan, Indiana, Illinois, and Wisconsin. They are divided into two bodies, the Restorationists and the Universalists proper, whose comparative numbers are not known. The Friends or Quakers are divided into two bodies, the Orthodox or Trinitarian, and the Hicksite or Unitarian Friends. Of late years a large number of persons have become believers in the phenomena known as spiritual manifestations or communications, and in many instances have formed themselves into congregations for religious worship in accordance with the views promulgated by so called spiritual mediums. These organizations, however, include but a small part of those who have become more or less attracted by spiritualism, and hence it is impossible to give any estimate of their actual numbers. Of the minor sects not affiliated with the leading denominations, we may name the Moravians or "United Brethren in Christ," principally found in Ohio, Pennsylvania, and Indiana; the New Jerusalem church, or Swedenborgians, in Massachusetts, and in most of the large cities of the country; the Shakers, who have communities in 5 or 6 states; and the Mormons, mostly in Utah territory, where they form an isolated community. Jewish congregations exist in most of the larger towns of the Union, consisting in large part of immigrants from Germany and Poland. The most important are those of New York, Philadelphia, Baltimore, Cincinnati, San Francisco, New Orleans, and Charleston. The salaries of the clergy are generally sufficient for their support, and even in the smallest villages or rural districts materially exceed those of a large proportion of the country curates of England, the priests of the smaller communes of France, or the lowest class of the clergy of Germany, Switzerland, and Denmark. The average salary of Congregational and Presbyterian ministers is said to be $700; of the Reformed Dutch and Episcopal clergy, about $600; of Baptist ministers, about $500; of Methodist ministers, $400; and of the Roman Catholic clergy, $500. Table XXXII. gives the number of churches, value of church property, and other statistics of the churches of each denomination in each state, as returned by the census of 1850. Table XXXIII. gives the number of churches, ministers, and members of the principal denominations at dates near Jan. 1861. —The several states of the Union, so far as their internal affairs are concerned, are sovereign and independent, while for the common interests of all they delegate a portion of their powers to a central government, whose edicts and laws, so long as they are not in conflict with the constitution, are paramount to state authority. All powers not expressly granted by the constitution to the federal government, nor prohibited by it to the states, are reserved to the states respectively or to the people. The government consists of three branches, the legislative, executive, and judicial. The executive power is vested in a president, who together with a vice-president is elected for 4 years by a college of electors, appointed in each state as the respective legislatures may direct, each state returning as many electors as it is entitled to have senators and representatives in congress. In South Carolina the electors are chosen by the legislature; in all the other states by popular vote. In case of the removal, death, resignation, or inability of the president, the vice-president succeeds to the presidency; and in case of the failure of both president and vice-president, congress has authority to declare what officer shall act as president until the disability be removed or a president shall be elected. By act of congress approved March 1, 1792, the president of the senate *pro tempore*, or in case there be no president of the senate, the speaker of the house of representatives, is to act as president in such a case. The latter contingency has as yet never occurred, and the former only in two instances, viz., on the death in office of Presidents Harrison (1841) and Taylor (1850). When there is no election of president by the people for want of a majority of electoral votes for any one candidate, the house of representatives chooses the president from the three having the highest number of votes, the body of representatives from each state casting a single vote. Two elections by the house have occurred, viz.: in 1800 (under the original provision of the constitution, which required that the highest candidate should be president and the next highest vice-president), when, there being a tie between Thomas Jefferson and Aaron Burr, the former was chosen president by the house; and in 1824, when John Quincy Adams was chosen. The president, as well as all other civil officers, may be removed from office on impeachment for and conviction of treason, bribery, or other high crimes and misdemeanors. He is commander-in-chief of the army and navy, and of the militia of the several states when they are called into the actual service of the general government; and has power, by and with the advice and consent of the senate, to make treaties, and to appoint ambassadors, and other public officers of the United States whose appointment is not otherwise provided for. He receives a salary of $25,000 a year, and the vice-president $8,000. All acts of congress must be presented to him before they can become law, and he may within 10 days from its presentation return any bill of which he disapproves to the house in which it originated, stating his objections. If on reconsideration the bill is again passed by two thirds of each house, it becomes law. The president must be a natural-born citizen, 35 years of age, and 14 years a resident within the United States. He is assisted by a cabinet of 7 ministers, called the secretaries of state, of the treasury, of the interior, of the navy, and of war, the attorney-general, and the postmaster-general, who are nominated by him and confirmed by the senate. They receive $8,000 a year each. The national legislature consists of a congress composed of a senate and house of representatives. The senate consists of 2 senators from each state chosen by the respective legislatures for 6 years, in such a way that one third of the whole body goes out of office every 2 years. The vice-president of the United States is president of the senate *ex officio*, and in his absence the senate elects a president *pro tempore*; he has only a casting vote. A senator must be 30 years of age, 9 years a citizen of the United States, and at the time of his election a resident within the state for which he is chosen. The senate has sole power to try all impeachments. The house of representatives is composed of members chosen for 2 years by the people of each state; they must be 25 years of age, 7 years citizens of the United States, and at the time of their election residents within the states for which they are chosen. The number of representatives in congress is fixed by law at 233, and they are apportioned among the several states according to their representative population, which is ascertained by adding to the number of free persons, including persons bound to service for a term of years, and excluding Indians not taxed, $\frac{3}{5}$ of all others (*i. e.*, slaves). Every state is entitled to at least one representative. New states admitted after the apportionment (which is made after each decennial census) elect representatives in addition to the limited number of 233, but such excess continues only till the next apportionment. There are also delegates, one from each organized territory, who are entitled to speak in the house, but not to vote. Table VI. shows the number of representatives to which the several states were entitled under the apportionments of 1850 and 1860. The house of representatives chooses its own speaker and other officers; has the sole power of impeachment; and originates all bills relating to revenue. Members of both senate and house receive $6,000 for each congress ($3,000 a year), and mileage at the rate of $8 for every 20 miles of travel in the usual road in going to and returning from the seat of government. The pay of the speaker of the house and of the president of the senate *pro tempore* is $12,000 a congress. The regular sessions of congress commence on the first Monday of December in each year, and extra sessions may be called by the president whenever he deems it necessary. The term of office of representatives, and consequently the duration of each congress, expires by law on the 4th day of March of every second year. Congress has power to lay and collect taxes, imposts, and excises, which must be uniform throughout the United States; to borrow money on the credit of the United States; to coin money; to define and punish piracy and offences against the law of nations; to declare war; to raise and support an army and navy; to provide for calling forth the militia when required; and to exercise exclusive legislation in all cases over the District of Columbia. Congress can make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press, or the right of the people peaceably to assemble and to petition the government for a redress of grievances. —The judiciary comprises a supreme court with one chief justice (salary $6,500) and 8 associate justices (salary $6,000 each), appointed for life by the president, by and with the advice and consent of the senate, and holding one session annually in Washington. The supreme court has jurisdiction in law and equity in all cases arising under the constitution, the laws of the United States, and treaties; cases affecting ambassadors, other foreign ministers, and consuls; cases of admiralty and maritime jurisdiction; controversies to which the United States may be a party; controversies between a state and citizens of another state, between citizens of different states, between citizens of the same state claiming lands under grants of different states, and between a state or the citizens thereof and foreign states, citizens, or subjects. In all cases affecting ambassadors, other public ministers, and consuls, and those in which a state is a party, it has original jurisdiction; in all the other cases before mentioned, the constitution gives it appellate jurisdiction, subject to such restrictions as congress may prescribe. By the act of Sept. 24, 1789, it has exclusive jurisdiction of all civil controversies to which a state is a party, except between a state and its citizens, and also except between a state and citizens of other states or aliens, in which latter case it has original but not exclusive jurisdiction. It has exclusive jurisdiction of all such suits or proceedings against ambassadors or other public ministers, or their domestics or domestic servants, as a court of law can have consistently with the law of nations; and original but not exclusive jurisdiction of all suits brought by ambassadors or other public ministers, or to which a consul or vice-consul may be a party. By the 11th amendment to the constitution the judicial power of the United States must not be construed to extend to any suit in law or equity commenced or prosecuted against any one of the United States by citizens of another state, or by citizens or subjects of any foreign state. The supreme court exercises appellate jurisdiction by writ of error or appeal from the final judgments of the circuit courts, of the district courts exercising the powers of circuit courts, and of the superior courts of the territories exercising the powers of circuit courts in certain cases. It has also appellate jurisdiction by writ of error from the final judgments and decrees of the highest courts of law or equity in a state in certain cases where there is question of the validity of a treaty, or of a statute of or authority exercised under the United States; or of the constitutionality of a statute of or an authority exercised under any state; or of the right construction of a clause of the constitution, treaty, or statute of or authority exercised under the United States. It has likewise jurisdiction in civil and criminal cases by certificate from the circuit court that the opinions of the judges are divided on points stated. The circuit courts are composed each of a justice of the supreme court and a judge of the district court in the district in which the court is held. The United States are divided into 9 judicial circuits, in each of which a court is held twice every year for each state within the circuit. As reorganized by act of congress in 1862, the circuits are constituted as follows: 1, Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut; 2, New York and Vermont; 3, New Jersey and Pennsylvania; 4, Delaware, Maryland, Virginia, and North Carolina; 5, South Carolina, Georgia, Florida, Alabama, and Mississippi; 6, Louisiana, Texas, Arkansas, Kentucky, and Tennessee; 7, Ohio and Indiana; 8, Michigan, Illinois, and Wisconsin; 9, Minnesota, Iowa, Missouri, and Kansas. There is also a circuit court in the District of Columbia, established by a particular act of congress, and composed of a chief justice and 2 associates; and the state of California is constituted as an extra circuit, with a judge who is not a justice of the supreme court. The circuit courts have original jurisdiction (provided the matter in dispute exceeds $500) in cases arising under the patent laws; suits on contracts brought by the United States; suits at common law where any officer of the United States acts under authority of an act of congress; bills in equity filed by the United States against the debtor of their debtor; civil controversies between a citizen of the state in which the suit is brought and a citizen of another state; civil suits to which an alien is a party; controversies between citizens of the same state claiming lands under grants of different states, &c. They have appellate jurisdiction from the district courts under certain regulations, the appeals taking place generally in civil causes of admiralty or maritime jurisdiction. In equity they have, by the act of Sept. 1789, original cognizance concurrent with state courts of suits of a civil nature where the matter in dispute exceeds, exclusive of costs, $500, and the United States are plaintiffs or petitioners, or an alien is a party, or the suit is between a citizen of the state where it is brought and a citizen of another state. In criminal matters the same act gives the circuit courts exclusive cognizance of all crimes and offences cognizable under the authority of the United States, except where that act otherwise provides or the laws of the United States shall otherwise direct; and concurrent jurisdiction with the district courts of all crimes and offences cognizable therein. The United States are also divided into 50 districts, in each of which there is a court called a district court, composed of one judge who is to reside in the district for which he is appointed. These courts have civil jurisdiction in admiralty and maritime causes, including prize suits, cases of salvage, and seizures under the laws of imposts, navigation, or trade of the United States; cases of seizure on land under the laws of the United States; suits for penalties and forfeitures under the laws of the United States; cases in which an alien sues for tort in violation of the laws of nations or of a treaty of the United States; suits instituted by the United States;

actions by and against consuls; and certain cases in equity. They have criminal jurisdiction, concurrent with the circuit courts, of all crimes and offences against the United States the punishment of which is not capital. Courts are established by the United States in each of the territories, their constitution and functions being prescribed by the act of congress organizing each territory. In general they assimilate closely to the various state courts. There is also a court of claims composed of a presiding judge and 2 associate judges (salary $4,000 each), which holds its sessions in the capitol at Washington. All the other courts are established by the authority of the several states, and their organization differs according to the state laws. The trial of all crimes, except in cases of impeachment, must be by jury.—The constitution forbids the suspension of the writ of *habeas corpus*, unless when in cases of rebellion or invasion the public safety may require it; the passing of any bill of attainder or *ex post facto* law; the imposition of any capitation or other direct tax except in proportion to the census, or of any tax or duty on articles exported from any state; and the passing of any commercial or revenue regulation giving a preference to the ports of one state over those of another state, or obliging vessels bound to or from one state to enter, clear, or pay duties in another. No money can be drawn from the treasury except in consequence of appropriations made by law, and a statement of the public receipts and expenditures must be published from time to time. No title of nobility can be granted by the United States, and no person holding any office of profit or trust under them can without the consent of congress accept of any present, emolument, office, or title of any kind from any king, prince, or foreign state. The right of the people to bear arms may not be infringed; soldiers may not be quartered in any house in time of peace without the consent of the owner, nor even in time of war except in a manner to be prescribed by law. The persons, houses, papers, and effects of the people are exempt from search and seizure except under a warrant issued upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched and the persons or things to be seized. No person may be held to answer for a capital or otherwise infamous crime unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia when in actual service in time of war or public danger; nor may any person be subject for the same offence to be twice put in jeopardy of life or limb; nor be compelled in any criminal case to be a witness against himself; nor be deprived of life, liberty, or property, without due process of law. In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial by an impartial jury of the state and district wherein the crime shall have been committed; to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor; and to have the assistance of counsel for his defence. Excessive bail may not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted. Private property may not be taken for public use without just compensation. No state can enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money, emit bills of credit, or make any thing but gold and silver a legal tender for debts; pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts; grant any title of nobility; or lay any imposts or duties on imports and exports, without the consent of congress, except what may be necessary for executing its inspection laws. The net produce of all imposts and duties laid by any state on imports or exports shall be for the benefit of the treasury of the United States. Without the consent of congress no state may lay any duty on tonnage; keep troops or ships of war in times of peace; enter into any agreement or compact with another state or with a foreign power; or engage in war unless actually invaded, or in such imminent danger as will not admit of delay. Treason against the United States consists only in levying war against them, or in adhering to their enemies, giving them aid and comfort. The punishment of treason is left to be defined by congress, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted. Full faith and credit shall be given in each state to the public acts, records, and judicial proceedings of every other state, and citizens of each state are entitled to all the privileges and immunities of citizens in the several states. Fugitives from justice escaping from one state into another shall be delivered up on demand of the executive authority of the state from which they have fled. Persons held to service or labor under the laws of any state, escaping into another state, must be given up on claim of the party to whom their service or labor is due. New states may be admitted into the Union by congress, but no new state can be erected within the jurisdiction of any other state, nor any state be formed by the junction of two or more states or parts of states, without the consent of the legislatures of the states concerned as well as of congress. The several states have exclusive power to prescribe the qualifications of voters and state officers, and the form of their state government. The constitution only requires that the form of government be republican, and that no law or ordinance be passed which would conflict with any law of the United States. Congress has power to dispose of and make all needful rules and regulations respecting the territories or other property belonging to the United States; governors and other functionaries for the organized territories are appointed by the president. The question as to the right to hold slaves within the territories, which had long been a subject of contention, was settled by the act of congress approved June 20, 1862, prohibiting for ever involuntary servitude except for crime in all the territories of the United States. —The finances of the United States at the close of the war of the revolution were in a most deplorable state; the continental currency authorized by congress, and emitted in vast sums and without any adequate provision for its payment, had depreciated till it was completely worthless; $500 in continental bills would hardly purchase a breakfast. Spurious emissions of large sums had rendered the whole issue of doubtful character, and much of it was never redeemed. The national debt was very heavy, while the developed resources of the country were small. In 1791 the national debt was $75,463,476, and for the next 15 years it averaged about $80,000,000. In 1806 commenced a systematic effort for its reduction, and in 1812 it was $45,209,738. The war of 1812-'15 raised it to $127,334,934. The prosperous and peaceful period which followed was eminently favorable to the gradual reduction of the debt, and in 1835 it had been practically extinguished, only $351,289 remaining, and in 1836 $291,089. The revenue at this time from the sale of public lands, and the large amount of receipts for customs, had accumulated to such an extent that more than $28,000,000 was distributed among the states in the ratio of their population, as a deposit liable to be called for by the government in any emergency, but without interest. It has never been recalled. The disasters resulting from the financial crisis of 1837 compelled the government to incur a small debt, which in 1839 was reported at $11,983,738. This was reduced in the two following years; but while the change in the tariff in 1842* eventually increased the amount of receipts from customs, the heavy expenses incurred in the Florida war more than kept pace with the increasing revenue, and the debt accumulated to $27,203,451 in 1843. It had fallen to $16,750,926 in 1846, when the Mexican war and the assumption of the debt of Texas, the Gadsden purchase, and the supposed necessity for maintaining lines of government mail steamers, coöperated to increase the national debt. In 1849 it was $64,704,694; in 1853, $67,340,629. From this point it fell off, the surplus revenue at the disposal of the government enabling it to buy up its own bonds, which it often did at a large premium in advance of their maturity. In 1857 the debt stood at $29,060,387; but by July 1, 1860, it had risen to $64,769,703. The condition of the country in the last 4 months of Mr. Buchanan's administration compelled a still further increase of the debt; and at the inauguration of Mr. Lincoln it stood at $88,995,810. The outbreak of civil war, and the necessity of creating and equipping a new army and navy, required a vast expenditure, which could only be met by the issue of treasury notes and bonds; but the confidence of the capitalists and the people in the stability and financial resources of the government insured the negotiation of these on favorable terms. On Dec. 1, 1861, the new government had issued $150,000,000 of bonds, $100,000,000 of which were to run 3 years, and to bear 7.3 per cent. interest, and $50,000,000 were 20-year bonds at 6 per cent. It had also issued $24,550,325 of demand treasury notes without interest, and a temporary loan of $3,993,900 for 60 days; making in all $178,544,225, and increasing the national debt to $267,540,035. In 1862 congress authorized the emission of other bonds and demand notes; and on May 29, 1862, the debt actually incurred and remaining unpaid was as follows:

Under what act.	Amount.	Total.
Loans, 1842, 6 per cent........	$2,883,364 11	
Loans, 1847, 6 per cent........	9,415,250 00	
Loans, 1848, 6 per cent........	8,908,341 80	
Loans, 1858, 5 per cent........	20,000,000 00	
Loans, 1860, 5 per cent........	7,022,000 00	
Loans, 1861, 6 per cent........	18,415,000 00	
Texan indemnity, 5 per cent...	3,461,000 00—	$70,104,955 91
Treasury notes issued		
Prior to 1857, int. stopped..	105,111 64	
Under act Dec. 18, 1857.....	175,900 00	
Under act Dec. 14, 1860.....	221,650 00	
June 22, 1860, and February and March, 1861, 6 per ct.	2,767,900 00	
March 2, July 17, and August 5, 1861, 6 per cent........	111,600 00—	3,382,161 64
3-year bonds, 7.3 per cent.....	120,523,450 00	
20-year bonds, 6 per cent.....	50,000,000 00—	170,585,455 00
Oregon war debt, 6 per cent...	....	878,450 00
United States notes, no int...	....	145,880,000 00
Certificates of indebtedness, 6 per cent..................	47,199,000 00	
5 and 20-year bonds, 6 per ct...	2,699,000 00—	49,818,400 00
4 per cent. temporary loan ...	5,913,042 21	
5 per cent. temporary loan ...	44,865,524 35—	50,778,566 56
Total amount of public debt............		$491,448,984 11

Average rate of interest on the entire debt, 4.354 per cent.

In tables XXXV. and XXXVI. will be found the annual revenue and expenditures from March 4, 1789, to June 30, 1861, and the condition of the public debt and the payments made for its redemption and interest during the same period. The amount received from loans and treasury notes from March 4, 1789, to June 30, 1861, was $462,935,664.64. The total of customs, lands, and miscellaneous is larger than the total receipts by about $39,000,000, a sum which represents losses, unavailable funds, &c. During this period of 72 years there have been 17 general and 18 special tariffs enacted. The dates of the general tariffs are: July 4, 1789; Aug. 10, 1790; March 3, 1791; May 2, 1792; June 7, 1794; Jan. 29, 1795; March 3, 1797; April 27, 1816; May 22, 1824; May 19, 1828; July 14, 1832; March 2, 1833 (the compromise tariff); Sept. 11, 1841; Aug. 30, 1842; July 30, 1846; March 3, 1857; March 2, 1861. The price of the public lands was fixed in 1785 at $1 per acre; May 18, 1796, it was raised to $2 per acre, but at a later date was reduced to $1.25, except in the alternate sections where grants have been made, in which it is held at $2.50 per acre. The receipts of the government for the year ending June 30, 1861, were:

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* The tariffs of 1824, 1828, and 1832 were protective, and that of 1833, known as the compromise tariff, was constructed with a sliding scale which did not reach its minimum of duties till 1841; and the new protective tariff of 1842 had at first the effect of reducing the amount of revenue.

Balance in the treasury, June 30, 1860	$3,629,206 71
From customs	39,582,125 64
From public lands	870,658 54
From miscellaneous sources	892,199 64
From loans and treasury notes	41,861,709 74
Aggregate receipts from all sources, and balance	$86,835,900 27

The expenditures for the same period were:

For the civil list (other than the public debt and the interior department)	$23,187,908 19
For interior department (Indians and pensions)	8,760,022 79
For the war department	22,981,150 44
For the navy department	12,428,577 09
For payment of Texas creditors	78,807 27
For redemption of loan of 1846	1,000 00
For the redemption of treasury notes	18,141,900 00
For interest on the public debt	4,000,178 76
Aggregate expenditure	$84,578,884 47
Balance in the treasury	$2,257,065 80

These statements, it will be noticed, do not include the postal revenue and expenditure, which are distinct, and will be given further on. The secretary of the treasury, at the commencement of the session of the 37th congress (Dec. 1861), presented the following estimates of the receipts and expenditures of the years ending June 30, 1862, and June 30, 1863. Though modified to some extent by circumstances not then foreseen, they will not probably vary greatly from the actual receipts and expenditures. The estimated receipts for the year ending June 30, 1862, were:

Balance in the treasury, July 1, 1861	$2,257,065 80
From customs	32,198,602 55
From public lands	485,967 08
From miscellaneous sources	1,918,095 86
From loans and treasury notes already realized at that time	197,242,588 14
From amounts yet to be realized on loans of July 17 and August 5	75,449,675 00
From direct tax	20,000,000 00
Aggregate of actual and estimated resources at that time provided, for the year	$329,501,994 38

The estimated expenditures were:

For the civil list	$35,854,626 97
For the interior department (Indians and pensions)	5,996,142 26
For the war department	366,720,544 24
For the navy department	67,817,983 58
For the redemption of the principal of the public debt	45,498,050 00
For Texan debt	112,092 59
For interest on public debt	21,407,083 42
Total estimated liabilities of the year	$548,406,422 06
Showing a deficiency of receipts of	$218,904,427 68

This deficiency congress provided for by authorizing the issue of legal tender treasury notes and bonds to the necessary amount. For the year ending June 30, 1863, the estimated receipts are:

From customs	$40,000,000 00
From public lands	800,000 00
From miscellaneous sources	5,000,000 00
From the direct tax laid in 1861	20,000,000 00
From internal duties	20,000,000 00
From the income tax	10,000,000 00
Total	$95,800,000 00

The receipts from customs and from taxes are greatly underestimated, as the revival of trade, the increased duties levied on articles of general consumption, and the proceeds of the comprehensive tax bill passed in June, 1862, could not be predicted. The estimated expenditures for the same year are:

For civil list, other than for the interior department and the public debt	$23,066,971 23
For interior department (pensions and Indians)	4,102,962 96
For the war department	360,159,956 61
For the navy department	45,164,994 18
Redemption of the loan of 1842	2,868,364 11
Interest on public debt	39,968,965 42
Aggregate of expenditures for the year	$475,331,345 51
Showing a deficiency to be provided for of	$379,531,345 51

The construction of a larger number of iron-plated vessels for the navy than was at that time contemplated, and the increase of the army beyond the numbers specified in the act of July, 1861, have probably raised the amount required for the war and navy departments beyond the sums specified in this estimate. The expenditure under the civil list, in the statement of expenses in 1861, included the compensation of members of congress and the executive and judiciary departments, the officers of the mint and branches, assistant treasurers and their clerks, inspectors, surveyors-general and their clerks, &c., and the expense of the government of the territories. These items amounted to $6,156,199.25. Under the head of "miscellaneous" are included expenditures for the coast survey; for transportation of the mails to foreign countries and by sea; for deficiencies of revenue in the post office department; collecting the revenue from customs; the erecting and maintenance of lighthouses, &c.; the erection and repairs of marine hospitals, custom houses, &c.; the taking of the 8th census; the printing and binding for the government; and expenses connected with the government of the District of Columbia. The expenditures of the post office department for the fiscal year ending June 30, 1861, were $13,606,759.11, of which $8,406,652.51 was for the transportation of inland mails and the payment of route and local agents and mail messengers, $440,524.02 for the transportation of foreign mails, and $326,097.35 for the ocean mails to California and Oregon; compensation to postmasters and their clerks, $3,461,363.45; postage stamps and stamped envelopes, $92,773.70; payments for balances due on British mails, $120,507.82; for balances on French mails, $24,440.59; payments to letter carriers, $149,073.62, &c. The gross revenue of the year was $8,349,296.40, of which $646,498.14 was for letter postage, $6,864,791.43 for stamps sold, $571,209.28 for newspaper and pamphlet postage, $19,305.66 for registered letters, $149,073.62 on account of letter carriers, $94,563.45 on account of emoluments, and $3,854.82 miscellaneous. As compensation for the transportation of free mail matter, $700,000 was appropriated from other funds, and the deficiency in the receipts beyond this was $4,551,966.98. The whole number of post offices, June 30, 1861, was 28,586; the number of route agents was 392, and of local agents 35; the number of mail routes was 6,340, and their length 140,399 miles, of which 22,018 miles was by railroad, 5,339 by steamboat, 30,733 by coach, and 82,309 by inferior means of transportation. The number of miles of annual transportation was 54,455,454. The cost of railroad transportation averaged 11 cts. per mile; steamboat, 15½; coach, 11; and inferior modes, 7 cts. The U. S. mint is considered a bureau of the treasury department. In the following table its coinage is given from 1858, the date to which it is brought down in the article Coin:

Years.	Gold.	Silver.	Aggregate.
1859.....	$19,777,418 70	$4,699,223 95	$24,476,642 65
1860.....	23,447,283 35	3,250,636 26	26,697,919 61
1861.....	80,708,400 64	2,883,706 94	83,592,107 58
Total .	$123,933,102 69	$10,833,567 15	$134,766,669 84

The following summary gives the amount of coinage of each metal from the establishment of the mint to June 30, 1861:

Gold....................................	$669,116,406 62
Silver....................................	128,159,481 97
Copper....................................	2,647,473 55
Total....................................	$799,923,362 14

Of this amount about $520,000,000 was from bullion derived from the mines of the United States. During the year ending June 30, 1861, the mint at Philadelphia, its branch at San Francisco, and the assay office at New York, were more fully employed than in any former year. The amount of bullion received at the mint and its branches and the assay office was: gold, $116,970,002.66; silver, $4,624,961.57; total deposits, $121,594,964.23. Deducting the redeposits, the amount left for coinage was $72,146,571.01. The coinage for the year was: gold coins, $60,693,237; fine gold bars, $20,015,163.64; silver coins, $2,605,700; silver bars, $278,006.94; cent coins, $101,660; total coinage, $83,693,767.58; number of pieces of all denominations of coin, 23,724,913. The branch mints at Charlotte, N. C., Dahlonega, Ga., and New Orleans were seized by the confederate authorities in the winter or early spring of 1861, and no returns were made from them later than March, 1861. In table XXVII. will be found detailed statistics of the banks of the different divisions of the United States for the 3 years ending June 30, 1858–'61; and table XXVIII. completes the view of the banking interest in the United States, from the date at which it is left in the article Bank to the close of 1861.—The policy of the country has never been to keep a strong military force in time of peace, but to rely upon volunteers in case of any emergency. In March, 1861, the army consisted of one major-general (lieutenant-general by brevet), 4 brigadier-generals, and 16,000 other officers and men. The several arms of the service were: 1 corps of engineers, 1 corps of topographical engineers, 1 ordnance corps, 2 regiments of dragoons, 2 regiments of cavalry, 1 regiment of mounted riflemen, 4 regiments of artillery, and 10 regiments of infantry. By act of congress, approved July 29, 1861, the president was authorized to add 22,714 men to the regular army, and the nominal strength of the force is now (July 1, 1862) as follows: 4 major-generals, 10 brigadier-generals, corps of engineers, corps of topographical engineers, ordnance department, 6 regiments of cavalry, 5 regiments of artillery, and 19 regiments of infantry. The organization of the regiments is represented in the following table:

Organization.	Cavalry.	1st, 2d, 3d, and 4th regiments artillery, each.	5th regiment artillery.	Old infantry regim'ts, each.	New infantry regiments, each.
Colonel................	1	1	1	1	1
Lieutenant-colonel....	1	1	1	1	1
Majors................	3	2	3	2	3
Captains..............	12	12	12	10	24
First lieutenants......	12	24	24	10	24
Second lieutenants....	24	12	24	10	24
Enlist'd men, minimum	1,208	718	1,722	548	1,587
" " maximum		1,058	1,794	868	2,367
Total, minimum	1,268	770	1,768	582	1,639
" maximum......		1,110	1,867	902	2,440

The new regiments are organized according to their maximum strength, that is, in 3 battalions, but it is not known how large a part of their men have thus far been enlisted. The corps of engineers consists of 1 colonel, 4 lieutenant-colonels, 8 majors, 12 captains, 15 first lieutenants, 15 second lieutenants, and 600 enlisted men. The topographical engineers comprise 1 colonel, 3 lieutenant-colonels, 3 majors, 10 captains, 13 first lieutenants, 13 second lieutenants, and 100 enlisted men. The ordnance department includes 1 brigadier-general, 2 colonels, 2 lieutenant-colonels, 4 majors, 12 captains, 12 first lieutenants, 12 second lieutenants, 15 military storekeepers, and 440 enlisted men. Including these 3 corps, and officers of the staff, of the adjutant-general's department, judge advocate's department, inspector-general's department, one signal officer, and officers of the quartermaster's, the subsistence, the medical, and the pay departments, who are not attached to regimental organizations, the total nominal maximum strength of the regular army is 41,247, which the president is empowered to increase to 44,898 by virtue of the act of June 17, 1850, authorizing him to raise to 74 the number of privates in any company serving on the western frontier and at remote and distant stations. This has been done in 69 of the 198 companies of the old army. In Jan. 1862, the following arsenals and armories were under the supervision of the war department: Kennebec, Me.; Springfield and Watertown, Mass.; Champlain (at Vergennes), Vt.; Watervliet (at West Troy) and New York, N. Y.; Alleghany (at Pittsburg) and Frankford (at Bridesburg), Penn.; Pikesville, Md.; Washington, D. C.; Fortress Monroe, Va.; St. Louis, Mo.; Leavenworth, Kansas; Detroit (at Dearbornville), Mich.; and Benicia, Cal. The arsenals at Fayetteville, N. C., Charleston, S. C., Mount Vernon, Ala., Baton Rouge, La., and San Antonio, Tex., were seized by the secessionists at the commencement of the civil war; and that at Harper's Ferry, Va., was burned by the U. S. forces to prevent it from falling into their hands. The only national military academy is that at West Point. On April 15, 1861, the president issued a proclamation calling for 75,000 militia to serve for 3 months in putting down the rising in the southern states, and by July 1, 77,875 men had come forward and were in the field. On May 4 a second call was made for 42,000 volunteers to serve 3 years or during the war, and on July 27 congress requested the states to furnish 500,000 volunteers for the same period. On Dec. 1 the strength of the entire army, volunteers and regulars, was reported by the secretary of war as follows:

Arms.	Volunteers.	Regulars.	Aggregate.
Engineers	....	107	107
Cavalry	54,654	4,744	59,398
Artillery	20,380	4,308	24,688
Riflemen and sharpshooters	8,395	....	8,395
Infantry	557,208	11,175	568,383
Total	640,637	20,334	660,971

In July, 1862, the president issued a call for 300,000 more volunteers, and on Aug. 4 ordered a draft of 300,000 militia, to serve for 9 months. The number of major-generals of volunteers, July 1, 1862, was 21, and of brigadier-generals 194. The number of general officers of volunteers is limited by act of congress to 40 major-generals and 200 brigadier-generals. The militia force of the United States, according to the latest returns received at the office of the adjutant-general, is 3,214,769, including 500 general officers and 3,458 general staff officers. These figures, however, can only be taken as approximative. Three of the states and all the territories except Utah have made no returns, and the returns from the others are for various dates from 1827 to 1860. (See MILITIA.) A large part of the militia is included in the above mentioned volunteer force, many regiments having entered the service in a body. By act of congress passed July 16, 1862, the president is authorized in certain emergencies to call forth the militia of any or all the states of the Union, and to continue them in service 9 months; and if, in consequence of defects in any of the state laws or in the execution of them, it shall be necessary to provide for enrolling the militia or otherwise putting this act into operation, the president is authorized to make all necessary rules and regulations. The enrolment of the militia must in all cases include all able-bodied male citizens between the ages of 18 and 45, and must be apportioned among the states according to representative population.—The navy, at the outbreak of the civil war in 1861, consisted of 90 vessels, pierced for about 2,415 guns. This included vessels on the stocks, stationary store ships, receiving ships, and vessels worn out and not worth repairing. The available force was:

1 ship of the line	84	guns.
8 frigates	409	"
20 sloops	406	"
3 brigs	16	"
3 store ships	7	"
6 steam frigates	212	"
5 first class steam sloops	90	"
4 first class side-wheel steamers	46	"
8 second class steam sloops	45	"
5 third class screw steamers	28	"
4 second class side-wheel steamers	8	"
2 steam tenders	4	"
69	1,346	guns.

Of this force the following were in commission, the remainder being in ordinary, dismantled, &c.:

2 frigates	100	guns.
11 sloops	232	"
3 store ships	7	"
1 screw frigate	12	"
5 first class steam sloops	90	"
3 side-wheel steamers	35	"
8 second class steam sloops	45	"
5 third class screw steamers	28	"
3 side-wheel steamers	5	"
1 steam tender	1	"
42	555	guns.

These vessels had a complement, exclusive of officers and marines, of about 7,600 men. One vessel (the sloop Levant) was lost in the Pacific; one steamer fell into the hands of the confederates at Pensacola; one steam frigate (the Merrimac), partially destroyed and sunk at Norfolk, was afterward raised by the confederates and cased with iron; and two sloops and one brig, beside several worthless vessels, were destroyed at Norfolk when that place was abandoned by the United States forces. By the completion of unfinished vessels, and the construction and purchase of others, the navy had been increased, at the date of the last report of that department (Dec. 1861), to 264 vessels (including those under construction), mounting 2,557 guns, measuring 218,016 tons, and manned by 22,000 seamen. These were as follows:

Class.	No. of vessels.	Guns.	Tonnage.
OLD NAVY.			
Ships of the line	6	504	16,094
Frigates	7	350	12,194
Sloops	17	342	16,031
Brigs	2	12	539
Store ships	3	7	343
Receiving ships, &c.	6	106	6,340
Screw frigates	6	222	21,460
First class screw sloops	6	109	11,953
First class side-wheel steam sloops	4	46	8,003
Second class screw sloops	8	45	[illegible]
Third class screw sloops	5	28	2,405
Third class side-wheel steamers	4	8	[illegible]
Steam tenders	2	4	[illegible]
PURCHASED VESSELS.			
Side-wheel steamers	36	160	26,680
Screw steamers	43	175	20,403
Ships	13	52	9,998
Schooners	24	49	5,324
Barks	18	78	6,433
Brigs	2	4	[illegible]
VESSELS CONSTRUCTED.			
Screw sloops	14	98	16,787
Steam gunboats	23	92	11,081
Side-wheel steamers	12	48	8,400
Iron-clad steamers	3	18	4,600
Total	264	2,557	218,016

The purchased vessels were all selected from the merchant marine, and altered to fit them to the necessities of war. Though most of them would be found incapable of standing a regular naval contest, they have proved well adapted for blockading service, for transports, and for coast and river fleets. In addition to the vessels enumerated above are the gunboat, ram, and mortar fleets built for action on the Mississippi and other western waters, under authority of the war department, but since transferred to the control of the secretary of the navy. The gunboats, constructed by order of Gen. Fremont, are 12 in number, mounting in the aggregate 126 guns, beside a rifled 12-pounder boat howitzer on each vessel. The guns are all 32, 42, and 64-pounders, except one, a 128-pounder. Seven of the gunboats are iron-plated. Gen. Fremont also caused 38 mortar boats to be built, each about 60 feet long and 25 feet wide, surrounded by iron-plated bulwarks, and carrying one 13-inch mortar. A number of schooners included in the above list of purchased vessels have also been fitted up as mortar boats, and were engaged in the capture of the Mississippi forts below New Orleans. The ram fleet, which first came into action in the naval engagement near Memphis, was fitted out by the late Col. Ellet. It consists of 8 or 10 river steam towboats, strengthened and armed with iron prows for the purpose of running down the vessels of the enemy. A number of iron and iron-clad vessels are now (Aug. 1862) building, including 6 on the plan of the floating battery Monitor. In Feb. 1862, congress authorized the construction of 20 iron-clad gunboats, appropriating $10,000,000 for that purpose. A naval school for the education of officers was established at Annapolis, Md., in 1845, and temporarily removed in April, 1861, to Newport, R. I. By act of congress approved July 16, 1862, the active list of line officers in the navy, with the maximum number of officers allowed to each grade, is constituted as follows; 9 rear admirals; 18 commodores; 36 captains; 72 commanders; 144 lieutenant-commanders; 144 lieutenants; 144 masters; 144 ensigns; and midshipmen (students of the naval academy) to the number of 2 for every member and delegate of the house of representatives, 2 for the District of Columbia, and 10 appointed at large by the president, beside whom the president may appoint 3 midshipmen yearly, to be selected from boys enlisted in the navy. The navy yards, at the commencement of President Lincoln's administration, were at Portsmouth, N. H.; Charlestown, Mass.; Brooklyn and Sackett's Harbor, N. Y.; Philadelphia, Penn.; Washington, D. C.; Norfolk, Va.; Pensacola, Fla.; and Mare island, Cal. By the act of congress reorganizing the navy department, approved July 5, 1862, the following bureaus are created: yards and docks, equipments and recruiting, navigation, ordnance, construction and repairs. steam engineering, provisions and clothing, and medicine and surgery. The marine corps is organized as a brigade, and subject to the laws and regulations of the navy except when detached for service with the army by order of the president of the United States. As reorganized by Congress in 1861, it consists of 1 colonel commandant, 1 colonel, 2 lieutenant-colonels, 4 majors, 1 adjutant and inspector, 1 paymaster, 1 quartermaster, 2 assistant quartermasters, 20 captains, 30 first lieutenants, 30 second lieutenants, and 3,074 enlisted men.—History. The country now comprised within the United States was, when first visited by Europeans, exclusively inhabited by the red or copper-colored race commonly called American Indians. Of the origin of these people nothing is positively known, though their own vague traditions and their general resemblance to the tribes of north-eastern Asia give a certain degree of plausibility to the theory that their ancestors came to America by way of Behring's straits or the Aleutian islands. There is some reason to believe that these savages were not the first occupants of the land, in almost every part of which, and especially in the valley of the Mississippi, are found monuments consisting of mounds and other earthworks of great extent, which are supposed to have been erected by an unknown and long extinct race. In physical appearance, manners, customs, religion, and social and political institutions, the Indians were so strikingly alike as to form but one people; yet they were divided into a multitude of tribes almost perpetually at war with each other, and speaking a great variety of dialects, among which have been traced 8 radically distinct languages, viz., the Algonquin, Iroquois, Cherokee, Catawba, Uchee, Natchez, Mobilian, and Dacotah or Sioux. The Algonquins inhabited the territory now included in New England, a part of New York and Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina as far south as Cape Fear, a large part of Kentucky and Tennessee, and the greater portion of Ohio, Indiana, Illinois, Michigan, Wisconsin, and Minnesota. Their most important tribes were the Knisteneaux, Ottawas, Chippewas, Sacs and Foxes, Menomonees, Miamies, Piankeshaws, Potawatomies, Kickapoos, Illinois, Shawnees, Powhatans, Corees, Nanticokes, Lenni-Lenapes or Delawares, Mohegans, Narragansets, Pequots, and Abenakis. The Iroquois occupied nearly the whole of that part of Canada which lies south of the Ottawa, between Lakes Ontario, Erie, and Huron, the greater portion of New York, and that part of Pennsylvania and Ohio which lies along the southern shore of Lake Erie. They were completely surrounded by the territories of their enemies the Algonquins. Their chief tribes, the Senecas, Cayugas, Onondagas, Oneidas, and Mohawks, formed a confederacy which was known to the English as the Five Nations, and after 1722, when they admitted the Tuscaroras, as the Six Nations. The English, however, often termed them collectively the Mohawks or Mingoes, the latter name being given them by the Algonquins.

The name Iroquois was applied to them by the French. Their own national appellation was Konoskioni or "cabin-builders." The Catawbas dwelt upon the Yadkin and Catawba rivers, along the line that now separates North and South Carolina. The land of the Cherokees extended from the Carolina Broad river on the east to the Alabama on the west, including the whole upper part of Georgia. Below them, on the Savannah, the Oconee, and the head waters of the Great Ogeechee and the Chattahoochee, were seated the Uchees, who spoke a harsh and peculiar language, and were apparently the decayed remnant of a once powerful nation. The rest of the state of Georgia, part of South Carolina, Tennessee, and Kentucky, and the whole of Florida, Alabama, and Mississippi, were occupied by a great number of kindred tribes who are known in our history as the Mobilian nation. Their territory, which was only inferor in extent to that of the Algonquins, stretched along the gulf of Mexico from the Atlantic to the Mississippi. They were divided into three great confederacies of tribes, the Muscogees or Creeks, the Choctaws, and the Chickasaws. Among their sub-tribes of most note were the Seminoles and Yemassees, who belonged to the Creek confederacy. A small territory on the eastern side of the Mississippi, on the banks of the Pearl river, was occupied by the Natchez, who, though surrounded by Mobilian tribes, were a distinct people, speaking a language of their own, and worshipping the sun. Beyond the Mississippi were the numerous tribes of the Dacotahs or Sioux, who occupied the country between the Arkansas on the south and Lake Winnipeg on the north, and westward to the Rocky mountains. Their principal divisions were the Winnebagoes, who dwelt between Lake Michigan and the Mississippi; the Assiniboins, the most northerly in position; the Minatarees, Mandans, and Crows, who lived west of the Assiniboins; and the southern Sioux, who held the country between the Arkansas and Platte rivers. Beyond the Dacotah nation, on the great plains, in the Rocky mountains, and on the Pacific slope, were the powerful tribes of the Pawnees, Comanches, Apaches, Utahs, Blackfeet, Snakes, Nezperces, Flatheads, and California Indians. While in possession of its savage aborigines, the country from the Mississippi to the Atlantic, and from the lakes to the gulf of Mexico, with comparatively slight exceptions, was one vast forest, inhabited by wild beasts, whose pursuit formed the principal occupation of the Indians, and gave them their chief means of subsistence and clothing.—According to the Scandinavian sagas, Leif, a Norwegian, sailed in 1002 from Iceland for Greenland, but was driven southward by storms till he reached a country called Vinland, from the wild grapes he found growing there. Other Scandinavian adventurers followed him, and made settlements, none of which were permanent. By many writers Vinland is supposed to have been Rhode Island or some other part of the coast of New England, but of its real position nothing is certainly known; and if these northern legends be rejected as too vague to afford a basis for sober history, we must conclude that the territory now comprised within the United States was first visited by Europeans about 5 years after Columbus discovered the West Indies. In 1497 John Cabot, a Venetian, commanding an English ship under a commission from Henry VII., sailed from Bristol westward, and on June 24 discovered land, along which he coasted to the southward for the distance of nearly 1,000 miles, landing at various points, and planting on the soil the banners of England and of Venice. In the following year his son Sebastian Cabot sailed with two ships from Bristol in search of a north-west passage to China; but finding the ice impenetrable, he turned to the south and coasted along as far as the entrance of Chesapeake bay. A few years later, in 1513, the Spaniard Ponce de Leon discovered Florida, and took formal possession of the country near where St. Augustine now stands; but on attempting shortly afterward to plant a colony, he was repulsed and mortally wounded by the natives. Toward the close of 1523 Francis I. of France sent John Verrazzani, a Florentine, to explore the North American coast. After a terribly tempestuous passage of 50 days, he made land near Wilmington, N. C., but found no convenient harbor, though he searched for one for 150 miles southward. Returning north, he sailed as far as Nova Scotia, stopping for a while in the harbors of New York and Newport, both of which are described in his narrative. Next followed the famous expedition of the Spaniard De Soto, who in 1539 landed with several hundred followers in Tampa bay on the west coast of Florida, and fought his way in the course of two years through the region which now forms the states of Georgia, Alabama, Mississippi, and Louisiana, to the river Mississippi, beyond which he penetrated for about 200 miles, and to which he returned to die in the third year of his expedition. After his death his discouraged followers descended the river in boats, and crossed the gulf to the Spanish settlements in Mexico. For a long period no further attempt was made by the Spaniards to colonize Florida. But in 1562 the French Calvinists, under the direction of Admiral Coligni, endeavored to found there a colony which might become a place of refuge for the persecuted Huguenots. Charles IX. conceded an ample charter, and an expedition under Jean Ribault made a settlement at Port Royal in South Carolina, the name of Carolina being then first given to the country in honor of King Charles. This colony was soon abandoned, and another, composed also of Protestants, was planted on the banks of the St. John's in Florida, which in 1565 was surprised and massacred by the Spaniards, who in the same year founded St. Augustine, now the oldest of American cities, and the first permanent settlement in the United States.—The discoveries of the Cabots had given the English crown a claim to North America, which, though not prosecuted for nearly a century, was never relinquished, and which led in the reign of Elizabeth to efforts at colonization on a large scale. In 1585 an expedition sent by Sir Walter Raleigh made a settlement on Roanoke island in North Carolina, which however failed so utterly that in a few years not a trace of it remained, the last of the colonists having been carried off captives by the Indians. James I. in 1606 divided the American territory claimed by England into two parts: South Virginia, extending from Cape Fear to the Potomac, and North Virginia, from the mouth of the Hudson to Newfoundland. Two companies were formed in England for the colonization of America: the London company, to which was granted South Virginia, and the Plymouth company, to which was granted North Virginia; and it was agreed that the region between the Potomac and the Hudson should be neutral ground on which either company might make settlements. The London company was earnest in the undertaking, and in 1607 sent out 3 ships and 105 emigrants, who entered Chesapeake bay, and founded on May 13 the commonwealth of Virginia by building Jamestown on James river, both names being given in honor of the English king. Capt. Newport commanded the expedition, but the master spirit of the enterprise was the celebrated Capt. John Smith, whose prudence, energy, and courage carried the settlement successfully through the perils which beset it, on the one hand, from the bad character of many of the colonists (who were, as Smith says, "unruly sparks packed off by their friends to escape worse destinies at home," and "poor gentlemen, broken tradesmen, footmen, and such as were much fitter to spoil and ruin a commonwealth than to help to raise or maintain one"), and on the other hand from the hostility of the natives, who however in 1614 were conciliated and made friendly for some years by the marriage of Pocahontas, the daughter of their king or principal chief Powhatan, to an Englishman. The government of Virginia was at first retained by the king in the hands of councils subject to his appointment or control; but after repeated changes the constitution was at length so framed that a house of burgesses chosen by the people was instituted, which met for the first time June 19, 1619. This was the beginning of representative government in America. It was closely followed by two events, both seemingly of slight importance at the time, but both destined to have a powerful and long continued influence on American affairs. In Aug. 1619, a Dutch man-of-war entered James river, and sold 20 Africans to the planters, thus introducing slavery into the colony; and two years afterward, in 1621, the cultivation of cotton was commenced. Capt. John Smith had returned to England in 1609, and in 1614 sailed again for America; and having examined the coast from the Penobscot to Cape Cod, he named the country New England. Previous to this, in 1607, two ships, commanded by Raleigh and Gilbert, had carried out a company of 45 emigrants, led by George Popham, by whom a settlement named St. George was formed near the mouth of the Kennebec, and abandoned in the following year. Smith on his return home published a map and description of New England, which, together with his personal representations of the advantages of emigration, excited much enthusiasm in England for colonizing America; and a patent was obtained from the king for a new company incorporated as "the council established at Plymouth in the county of Devon for the planting, ruling, ordering, and governing New England in America," which gave the planters absolute property, with unlimited jurisdiction, the sole powers of legislation, the appointment of all officers and all forms of government, over the territory, extending in breadth from the 40th to the 48th degree of north latitude, and in length from the Atlantic to the Pacific. This area comprised more than a million of square miles, and covered the present provinces of Nova Scotia, New Brunswick, and the Canadas, New England, New York, Pennsylvania, nearly half of New Jersey, and all the continent lying directly west of those states. The first English settlement within its limits, however, was established without the knowledge of the corporation and without the aid of King James, by the "pilgrim fathers of New England," a body of Puritans who, led by John Carver, William Brewster, William Bradford, Edward Winslow, and Miles Standish, sailed from England, Sept. 6, 1620, in the Mayflower, a vessel of 180 tons burden, and landed Dec. 21 (Dec. 11, O. S.), to the number of about 100 men, women, and children, at a harbor in Massachusetts bay where they began to build a town, which they called Plymouth in memory of the hospitalities received at the last English port from which they had sailed. "A grateful posterity," says Bancroft, "has marked the rock which first received their footsteps. The consequences of that day are constantly unfolding themselves as time advances. It was the origin of New England; it was the planting of the New England institutions. Inquisitive historians have loved to mark every vestige of the pilgrims; poets of the purest minds have commemorated their virtues; the noblest genius has been called into exercise to display their merits worthily, and to trace the consequences of their daring enterprise. . . . . As the pilgrims landed, their institutions were already perfected. Democratic liberty and independent Christian worship at once existed in America." The government of the colony was strictly republican. The governor was elected by the people, and restricted by a council of 5 and afterward of 7 assistants. The legislature at first comprised the whole body of the people, but as population advanced the representative system was adopted. The foundation of the Plymouth colony was followed by that of Massachusetts Bay, where Salem was settled by John Endicott in 1628. In 1630 a fleet arrived with 840 additional emigrants, with John Winthrop, a man approved for piety, liberality, and conduct, at their head as governor, and Thomas Dudley as deputy governor. In September of the same year they settled Boston, which they named in honor of the town in England from which came their minister, the Rev. John Cotton. In 1692 Plymouth colony was united to Massachusetts. While these settlements on Massachusetts bay were in progress, Sir Ferdinando Gorges and John Mason obtained a patent for a territory called Laconia, extending from the Atlantic to the St. Lawrence and from the Merrimack to the Kennebec, and settled Portsmouth and Dover in New Hampshire in 1623. In Maine a French colony had been planted in the island of Mount Desert as early as 1613, which was soon broken up by an expedition from Virginia; and the first permanent English settlements in Maine were made at Saco and on the island of Monhegan in 1622 or 1623. These settlements, however, ultimately fell under the jurisdiction of Massachusetts, and Maine continued to form a part of that commonwealth till 1820. Connecticut was colonized in 1635 by emigrants from Massachusetts, who settled at Hartford, Windsor, and Wethersfield, though a few huts had been erected at the latter place a year or two before, and the Dutch, who claimed the territory, had in 1633 built a fort and trading house at Hartford. Rhode Island was first settled at Providence in 1636 by Roger Williams, who had been exiled from Massachusetts for maintaining religious and political opinions at variance with those of the rulers of that colony. The first white man that ever set foot upon the soil of New York was Samuel Champlain, the French navigator, who in July, 1609, entered the lake which bears his name, and fought a battle on its shores with a band of Mohawks, whom he defeated, and thus brought upon the French the lasting hatred of the powerful confederacy of the Six Nations. Later in the same year, Sept. 6, Henry Hudson, an Englishman in the service of the Dutch East India company, entered New York bay and discovered the river to which his name has been given, and which he ascended nearly as far as the site of Albany. The region thus discovered was claimed by Holland and named New Netherlands; and in a few years trading posts were erected at Fort Orange, now Albany, and on Manhattan island. In 1623, 18 families settled at Fort Orange, and 80 families at New Amsterdam on Manhattan island, on the present site of the city of New York. The Dutch settlements gradually spread up the river, and eastward to the Connecticut, and westward and southward to the Delaware. On the latter river they came in collision with the Swedes, who had settled there in 1638 and occupied both banks in Delaware and Pennsylvania nearly to the site of Philadelphia, and named their settlements New Sweden. They were finally expelled in 1655 by a Dutch army; but the English, who claimed the whole country under the right given by Cabot's discovery, after much diplomatic controversy protracted through nearly half a century, at length ended the contest by seizing New Amsterdam by force in 1664, and with it the whole of New Netherlands. The province in the same year had been granted by Charles II. to his brother the duke of York and Albany, in whose honor New Amsterdam was named New York, which also became the name of the province, while Fort Orange became Albany. New Jersey at this time acquired its distinctive name from Sir George Carteret, who had been governor of the island of Jersey, and in conjunction with Lord Berkeley had purchased the territory from the duke of York and made it a separate colony. In 1681 the territory west of the Delaware was granted to William Penn, who colonized it chiefly with Friends or Quakers, and founded Philadelphia in 1682. Pennsylvania soon became one of the most flourishing of the colonies, and was honorably distinguished among them for the kindness and justice of its treatment of the Indians, and its consequent exemption for nearly a century from the horrors of savage warfare. About 1710 a large immigration of Germans began, which peopled several counties and gave a peculiar character to the population of the province. The country between the southern line of Pennsylvania and the Potomac was early called Maryland, in honor of Henrietta Maria, the queen of Charles I. The first settlement within its limits was made in 1631 by Capt. William Clayborne, with a party of men from Virginia, on Kent island in Chesapeake bay. In 1682 Charles I. granted the province by a charter to Cecilius Calvert, Lord Baltimore, who sent out in 1633 a colony of 201 persons, nearly all of them Roman Catholic gentlemen and their servants, led by the brother of the lord proprietor, Leonard Calvert, who became the first governor of the province. They crossed the Atlantic in two vessels named the Ark and the Dove, and landed on St. Clement's island, March 25, 1634. Two days afterward they began a settlement at St. Mary's on the mainland. The first legislature met in 1639, and in 1649 the assembly passed the memorable act by which Christians of all sects were secured in the public profession of their faith, and allowed to worship God according to the dictates of their own consciences. The country south of Virginia was first permanently settled in 1670 by English colonists, who landed at Port Royal, but soon removed to the present site of Charleston. Under the name of Carolina the colony was nominally governed in accordance with the provisions of an aristocratic constitution framed by the philosopher John Locke, till 1727, when the king bought out the proprietors and divided the colony into two, called respectively North and South Carolina. The present state of Georgia originally formed part of Carolina, but in 1732 George II., in honor of whom it was named, granted the territory to a corporation entitled "the trustees for settling the colony of Georgia;" and in the same year a colony of 120 persons sailed for the new province, under the direction of the celebrated Gen. James Oglethorpe.—In the course of little more than a century from the settlement of Jamestown, 13 colonies were thus founded by the English within the present limits of the United States. Within the same limits the Spaniards had also settled in Florida and New Mexico, and the French had established posts in Illinois, in Indiana, and in Louisiana near the mouth of the Mississippi. Though the emigration to the English colonies was mostly from England itself, and the language, laws, and manners of England everywhere prevailed, Scotland, Ireland, Germany, Holland, France, and Scandinavia each contributed more or less extensively to their population. Nearly all the sects of Christendom were also represented; and while Calvinism predominated in New England, Quakerism in Pennsylvania, and Roman Catholicism in Maryland, the church of England preponderated in New York and in the South. In the genial climate and fertile soil of the southern colonies, where labor was chiefly performed by African slaves, a more easy and lavish style of living prevailed than in the bleak and barren land of the Puritans, though as population advanced the thrift and industry of the Yankees (an Indian corruption of the word English), as the New Englanders were termed by their southern neighbors, produced the usual effects in developing among them a high degree of wealth, comfort, and refinement. Though agriculture was the chief pursuit of the colonists, manufactures and commerce were not wholly neglected. But as early as 1660 the mother country, jealous of the increasing prosperity of her children beyond the Atlantic, began to hamper their trade with navigation acts selfishly designed to compel the commerce of the Americans to pass exclusively through English hands. The house of commons in 1719 declared "that erecting any manufactories in the colonies tended to lessen their dependence upon Great Britain," and laws were accordingly enacted prohibiting the working of iron and steel in the colonies, and restricting other branches of manufacture. It was declared that no sugar, tobacco, ginger, indigo, cotton, fustic, or dyeing woods should be transported to any other country than those belonging to the crown of England, under penalty of forfeiture. The importation of European commodities into the colonies was prohibited except in English ships from England, and thus the colonies were compelled to buy in England not only all English manufactures, but every thing else that they might need from any soil but their own. The colonists were allowed to sell to foreigners only what England would not take, that so they might gain means to pay for the articles forced upon them by England. As they could buy few European and no Asiatic commodities except in the mother country, the English merchant was able to sell his goods for more than they were worth, and at the same time, being the sole legal purchaser of colonial products, could obtain these products at less than their fair value. In spite of these obstacles, the enterprise and industry of the colonists soon created a vigorous commerce, and even manufactures were not unknown, especially in Massachusetts, where the people manufactured paper, woollen goods, hemp, and iron, and nearly every family made coarse cloth for its own use. Notwithstanding their general poverty, and the hardships incident to the condition of a scanty population busily engaged in subduing the wilderness and its tribes of savages, the colonists, especially in New England, paid prompt and special attention to education. Schools were formed in Virginia as early as 1621, and in 1692 William and Mary college was established at Williamsburg. A school was founded in New, Amsterdam in 1633. Harvard college in Massachusetts was founded in 1637, and Yale college in Connecticut in 1701; the college of New Jersey was incorporated in 1738, and King's (now Columbia) college in New York in 1754. In the New England colonies, as soon almost as they were founded, laws were enacted providing for a liberal system of common schools, under which the people soon became remarkable for intelligence; a system continued with unbroken perseverance and with ever increasing improvement to the present day.—The 13 colonies thus settled in the course of little more than a century from the foundation of Jamestown were New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia. The details of colonial history being given in this work under the names of the individual states, we shall only notice here the most prominent events of general interest, which may be classed under the three heads of Indian wars, French wars, and political struggles against the English government. The Indians at first received the whites as friends; but the steady encroachments of the settlers on their hunting grounds, and the manifold causes of quarrel incident to the contact of races so different, speedily led to acts of violence on both sides, and at length to open war, though to the last a few tribes continued faithful friends to the Europeans. In the infancy of the settlements these conflicts with the warlike savages were often bloody and perilous; but as the colonies grew in strength, their numbers, discipline, and superiority in arms gave them an assured victory whenever roused to put forth their power. The first serious encounter took place in 1622, after the death of the friendly Powhatan, when a general conspiracy of the Indians of Virginia broke out in a bloody massacre, in which in one hour 350 of the English fell beneath the tomahawk. The colonists were victorious in this contest, and again in 1644–'6, when the Virginian tribes made their last struggle for independence, led by Opechancanough, who was captured and kept in prison till he died. From that period the red men gave little further trouble in Virginia, but peacefully submitted to the colonial authorities. In 1636 the powerful Pequot tribe commenced hostilities in Connecticut, which soon spread into Massachusetts and provoked an alliance of those colonies, by whose forces in 1637 the hostile nation was utterly destroyed, and such a terror struck into the remaining tribes that they did not venture again to molest the whites till 1675, when the famous Metacomet, sachem of the Wampanoags, or King Philip as he was called by the English, effected a general combination of the aborigines against the colonists. A terribly destructive war ensued, which for some months threatened the extermination of the European population of New England, but was finally ended by the defeat and death of Philip in 1676. Forty years later the Carolinas became involved in a fierce and sanguinary struggle with the Corees and Tuscaroras (1712), and with the Yemassees (1715), in both of which the whites were victorious. Notwithstanding these and other signal successes for more than a century and a half after the first settlement, there were few parts of the country which had not cause from time to time to tremble at the apprehension or the actual outbreak of Indian warfare, with its horrid accompaniments of outrage, massacre, and devastation, in which neither sex nor age was spared by the ruthless enemy. Toward the close of the 17th century the hostile Indians on the northern and western frontiers began to receive powerful aid and encouragement from the French in Canada, who, whenever their mother country was at war with England, carried on hostilities with the English colonies, and frequently, accompanied by their savage allies, made destructive inroads into New England and New York. In one of these incursions in 1689, Dover in New Hampshire was burned by the Abenakis or eastern Indians, and all the inhabitants were killed or carried away captive; and in the following year a similar fate was inflicted on Schenectady in New York, by a party from Montreal. A few years later (1704–'8) Deerfield and Haverhill in Massachusetts were destroyed, with hundreds of men, women, and children, by bands led by Hertel de Rouville, a French officer. Father Marquette, Louis Joliet, Robert Cavalier de la Salle, and other able and enterprising missionaries and adventurers, had carried the cross and the standards of France through the wilderness, from the St. Lawrence and the great lakes to the Mississippi and the gulf, and even into Texas; and gradually the English settlements on the Atlantic were flanked on their western side by a chain of French posts, amounting finally to more than 60 in number, between Montreal and New Orleans. Many of these positions, selected with judgment at an early period, became afterward important towns, as Detroit (1683), Kaskaskia (1684), Vincennes (1690), New Orleans (1717), and Pittsburg (Fort Duquesne, 1754). This threatening lodgment of the French in the rear of their American colonies greatly excited the jealousy of the English, who, under the charters granted by James I., claimed dominion westward from the Atlantic to the Pacific, south of the latitude of the north shore of Lake Erie, while the French claimed all the territory watered by the Mississippi and its tributaries under the more plausible title of having made the first explorations and settlements. The earliest conflict between the two nations in America arose, however, not from any colonial quarrel, but from the revolution of 1688, and is known as King William's war. It lasted 7 years, and during its continuance the colonies suffered exceedingly from the incursions of the French and their Indian allies. In retaliation for these attacks efforts were made by the colonists to conquer Canada, against which in 1690 two expeditions were sent, one from Massachusetts under Sir William Phipps, and another from Connecticut and New York under Gen. Winthrop, neither of which accomplished any thing of importance. The war was terminated by the treaty of Ryswick, Sept. 20, 1697, but peace was not of long continuance. The war of the Spanish succession, which began in 1702, involved in its hostilities the French and English in America, where the contest is known in tradition and history as Queen Anne's war. Its effects were chiefly felt in New England, whose whole western frontier was ravaged by the Indians to such an extent that most of the remote settlements were destroyed or abandoned. In 1707 Massachusetts, New Hampshire, and Rhode Island combined their forces and made an attack on the French in Acadia, but effected nothing. Three years later, in Sept. 1710, an expedition from Boston succeeded in conquering Acadia, and annexing it to the English empire under the title of the province of Nova Scotia. A powerful armament of English and New England troops, under Sir Hovenden Walker, attempted in the following year the conquest of Canada by sea, but failed, as did another expedition which at the same time marched from Albany to attack Montreal. The peace of Utrecht (April 11, 1713) terminated hostilities, which were not resumed for more than 30 years. At the expiration of that period the war of the Austrian succession broke out in Europe (March, 1744), and spread to America, where it is known as King George's war. Its principal event was the capture of Louisburg, the chief stronghold of the French in America, which was taken June 28, 1745, by a force from New England led by William Pepperell, a wealthy merchant of Maine. This exploit excited much enthusiasm in England as well as in the colonies, and gave the Americans an idea of their own military strength which had an important influence in the future. The war ended by the treaty of Aix la Chapelle, Oct. 18, 1748, and much to the disgust of the colonists Louisburg was restored to the French. Peace, however, was not of long continuance. The governor of Virginia, by command of the home government, granted to the "Ohio company," in 1749, 500,000 acres lying between the Monongahela and Kanawha and on the Ohio, in a region claimed by France. The company attempted to form settlements, and speedily became involved in disputes with the French, whose posts preoccupied various points in the country. The Virginia authorities took up the quarrel, and their first step was to send a letter of remonstrance to the French commandant on the Ohio. This message was intrusted to George Washington, a youth of less than 22 years of age, but who had already filled for 3 years the office of adjutant-general of the northern district of Virginia, and acquired a reputation for prudence and ability. He performed his mission with courage and judgment, and his report led Virginia to prepare to assert her rights by force. An expedition, of which Washington, at first second in command, soon became chief, was sent toward the Ohio, and on May 28, 1754, attacked and cut to pieces a French detachment under Jumonville, who was slain in the fight. This affair began the long contest known in America as the French and Indian, and in Europe as the 7 years' war. Hostilities, however, were waged in America for more than a year and a half before war was formally declared between France and England; but while still professing to be at peace, each country actively sent military and naval aid to its belligerent colonies. Four expeditions against the French were planned by the English commanders: one to capture the posts near the head of the bay of Fundy, and to expel the French from Acadia; another against Crown Point, to be led by Sir William Johnson, Indian agent among the Mohawks; the third against Niagara and Frontenac, to be commanded by Gov. Shirley of Massachusetts; and the fourth, against Fort Duquesne on the Ohio, was to be led by Gen. Braddock, who had been sent from England as commander-in-chief of the royal forces. He was an officer of high reputation as a martinet, but arrogant, conceited, and, like most of his countrymen at that period, full of stupid contempt for the Americans. With a mixed force of regulars and provincials, the latter commanded by Washington, he moved through the wilderness with all the formality of a military march in open country, and not sufficiently mindful of the precautions which Washington and other Virginians acquainted with the Indian mode of warfare entreated him to take. The result was, that about 10 miles from Fort Duquesne he fell into an ambush, and was defeated and mortally wounded. The army was withdrawn from danger chiefly by the steadiness and skill of Washington and his despised provincials, who covered the retreat. It may be noticed as the most permanent result of this expedition, that it shook the confidence of the people in the prowess of the British soldiery, disgusted them with the haughtiness and conceit of the British officers, and gave to Washington a hold on popular esteem and confidence which was never afterward shaken. Shirley's expedition, though less disastrous than that of Braddock, was also a failure. It was impeded by storms and sickness, and by the desertion of its Indian allies, who belonged to the tribes of the Six Nations, and was finally given up without having effected any thing. The attack on the French posts at the bay of Fundy was led by Gen. Winslow, a New Englander, who succeeded in his enterprise, and subsequently, at the express orders of the government, transplanted the "neutral French" from Acadia to the English colonies. The expedition of Sir William Johnson against Crown Point was composed chiefly of troops from Massachusetts, Connecticut, and New Hampshire. It encountered the enemy at the head of Lake George, and in one day, Sept. 8, 1755, suffered a repulse and gained a complete victory, in which the French commander Dieskau was incurably wounded and made prisoner. Johnson did not know how to improve his victory, the honor of which belonged in fact to the provincial general Lyman, and loitered in his camp at Lake George until it was too late to push on to Crown Point; and the campaign of 1755 ended on the whole more favorably for the French than the English. The energy and ability of the marquis de Montcalm, who succeeded Dieskau as commander-in-chief in Canada, gave during the next two years a still more marked superiority to the French arms. Oswego, with an immense amount of military stores, was captured in 1756; and Fort William Henry, at the head of Lake George, was compelled to surrender in 1757, an event long remembered with horror from the massacre of part of the garrison after the capitulation by Montcalm's Indian allies. These disasters in America were rightly attributed by the English people to the imbecility of their rulers and generals, and their clamors compelled the king reluctantly to call William Pitt to the head of affairs. His genius and energy speedily retrieved the fortune of the war. His call for volunteers from the colonies was responded to in numbers greater by thousands than he had asked for, and the campaign of 1758 opened with 50,000 men in the field under the English banner. Louisburg was taken after a siege of 50 days by Generals Amherst and Wolfe; Fort Frontenac on Lake Ontario was captured by Col. Bradstreet, with a provincial force; and Fort Duquesne met the same fate from an expedition of which Washington was one of the commanders. These advantages, however, were counterbalanced by the repulse of an attack on Ticonderoga made by a powerful army under Gen. Abercrombie and Lord Howe, in which the latter officer, who was greatly beloved, fell at the head of his troops, while the former so mismanaged the enterprise that, although his forces were 4 times as numerous as those of Montcalm, he was obliged to retreat with a loss of 2,000 men. Abercrombie was promptly superseded by Amherst, before whose approach in 1759 the French fled from Ticonderoga and Crown Point without striking a blow. Almost at the same time Niagara was taken by Sir William Johnson, and a large force sent to its relief was completely routed. The crowning exploit of the campaign and of the war was the taking of Quebec by an army led by Gen. Wolfe, after a battle on the plains of Abraham (Sept. 13), in which both Wolfe and Montcalm were killed. This victory, "one of the most momentous in the annals of mankind," says Bancroft, "gave to the English tongue and the institutions of the Germanic race the unexplored and seemingly infinite west and north. . . . . America rung with exultation; the towns were bright with illuminations, the hills with bonfires; legislatures, the pulpit, the press echoed the general joy; provinces and families gave thanks to God. England, too, which had shared the despondency of Wolfe, triumphed at his victory, and wept for his death. Joy, grief, curiosity, amazement were on every countenance." The surrender of Quebec virtually decided the contest in America, though it continued in Europe and on the ocean till 1763, when by the treaty of Paris Canada and its dependencies were formally ceded to Great Britain. Among these dependencies were several stations on the great lakes, and little stockade posts between the lakes and the Ohio and in the valley of that river. The transfer of these posts from the friendly and conciliatory French to the hostile and domineering English greatly excited the Indians in that region; and soon after the close of the war Pontiac, a chief of distinguished courage and ability, persuaded the Ottawas, Miamis, Wyandots, Chippewas, Potawatomies, Shawnees, Foxes, Winnebagoes, and other Algonquin tribes to engage in a conspiracy against the conquerors, which broke out in June, 1763. Within a fortnight all the forts west of Oswego were taken by the Indians, except Niagara, Pittsburg, and Detroit. The garrisons were nearly all put to death, more than 100 traders were murdered, and more than 500 families butchered or driven from their homes. Detroit was besieged for 6 months, but was finally relieved, and the Indians were compelled to sue for peace. Pontiac, however, refused to submit, and wandered toward the Mississippi, stirring up the tribes of the west against the English, till his career was ended by assassination in 1769.—The termination of the 7 years' war left the colonies poor and exhausted, for their contributions in men and money had been very large, and they had suffered severely from the enemy during the mismanagement of the first half of the contest. Nevertheless they had gained greatly by the struggle. The conquest of Canada, of Louisburg, and of the military posts on their western frontier, extinguished their chief source of anxiety and danger, and freed them for ever from any serious dread of the Indians, who were really formidable only when supported by the French. Then, too, the incapacity of the English generals and the defeats sustained by large bodies of English troops had materially weakened their superstitious reverence for the power of the mother country, while their own exploits in the war had given them a confidence in their strength hitherto unfelt. At this period the population of the colonies was estimated at 2,500,000, of whom 500,000 were negro slaves. The general characteristics of the people were intelligence, industry, and a high degree of moral and religious culture. They were descended for the most part from intelligent and enterprising ancestors, who had emigrated from the old world either to secure to themselves greater freedom to worship God or better opportunities to acquire competence or wealth. The passage across the Atlantic was tedious and expensive, and life in the new settlements hard and perilous. The lazy, the timid, the improvident, the brutally ignorant, shrank from the terrors of the sea and the wilderness, and the vast majority of the emigrants were of the respectable and energetic middle class. Religious influences operated powerfully, not only in giving an impulse to emigration, but on the character of the emigrants in their new homes; and not only on the Puritans, Huguenots, and Quakers, who came avowedly from the highest motives, but on vast bodies of churchmen, Dutch Calvinists, and Scotch-Irish Presbyterians. Much care was devoted to the education of children, and especially to training them in a knowledge of the Bible and the catechism, and in reverence for the sabbath. In Virginia the laws enacted that in every settlement there should be "a house for the worship of God." Absence from church was punished by a fine, and travelling or shooting on the sabbath was forbidden. In the Carolinas there were similar laws, and in Pennsylvania acts were passed against "stage plays, playing of cards, dice, May games, masques, and balls." Similar also was the legislation of the New England colonies, where in addition at some periods sumptuary laws and laws regulating the use of tobacco were in force. The spirit of political freedom was strongly developed among the colonists, and republican ideas and feelings transmitted from the period of the commonwealth in England were widely diffused, though at the same time a warm attachment existed for the mother country and a devoted loyalty to the crown. This attachment was disinterested, for though England afforded protection during the wars with the French, these wars, with the single exception of that recently concluded, had originated in Europe, and were waged for objects with which America had neither concern nor sympathy. In many other respects the connection was injurious to the colonies. Their trade and manufactures were systematically restricted for the selfish benefit of England; but though these oppressive enactments were heavily felt by the colonists, they made no resistance so long as the imperial authority confined itself to measures which, however harsh or injurious, were not clearly unconstitutional. But in 1761 parliament authorized sheriffs and officers of the customs to use "writs of assistance" or general search warrants which empowered them to enter stores and private dwellings and search for merchandise which it was suspected had not paid duty. These writs were first used in Massachusetts, where they roused great excitement and opposition. Obedience was refused to them on the ground of illegality, and a trial ensued in which the eloquent James Otis, the advocate-general of the crown, refused to defend them, but resigned his office and appeared in behalf of the people. His speech made a profound impression. "Otis was a flame of fire," says John Adams; "he carried away all before him. American independence was then and there born. Every man of an immense crowded audience appeared to me to go away, as I did, ready to take arms against the writs of assistance." The judges evaded a decision, and the writs, although secretly granted, were never executed. In Virginia two years later occurred a collision between the royal prerogative and the colonial legislation on the subject of dues to the clergy, in which the cause of the colony was defended by Patrick Henry, a young man of 27 years, who then first displayed the eloquence which has made his name so celebrated. It was at length decided in England to tax the colonies directly in spite of all their protests, and the stamp act passed the house of commons March 22, 1765, by a vote of 9 to 1, and 10 days later passed the house of lords almost unanimously and received the signature of George III. This act declared that every document used in trade, to be valid, must have affixed to it a stamp, the lowest in value costing a shilling, and thence increasing indefinitely in proportion to the value of the writing. To enforce the act, against which while under discussion the colonies had vehemently remonstrated, parliament authorized the ministry to send as many troops as they saw proper to America, for whom the colonies were required to find "quarters, fuel, cider or rum, candles, and other necessaries." These acts created great excitement and indignation in America. The Virginia assembly passed resolutions, introduced by Patrick Henry, declaring that the people of that colony were only bound to pay taxes imposed by their own legislature. The legislature of Massachusetts resolved that the courts should conduct their business without the use of stamps. In New York and Pennsylvania the opposition, though not so general, was yet very strong. Everywhere the people determined not to use the stamps, and associations calling themselves "Sons of Liberty" were organized in opposition to the act and for the general defence of the rights of the colonies. So powerful were these combinations, and so intense the popular indignation, that when the day came (Nov. 1) on which the obnoxious law was to go into effect, it was found that all the stamp distributors had resigned their offices. Meantime in June the Massachusetts legislature issued a circular inviting all the colonies to send delegates to a congress at New York on the first Tuesday of October. On that day delegates from 9 of the colonies appeared. The congress drew up a declaration of rights, a memorial to parliament, and a petition to the king, in which they claimed the right of being taxed only by their own representatives. The colonial assemblies approved the proceedings of the congress, and thus for the first time in their history a federal union was formed among the American colonies. On Nov. 1, the day on which the stamp act went into operation, the bells throughout the country were tolled and the flags lowered to half mast to indicate "the funeral of liberty." The merchants of the principal cities agreed to purchase no more goods in England till the act was repealed, and the people pledged themselves to use no articles of English manufacture. These demonstrations of popular feeling in America led parliament to consider the repeal of the act. Animated debates took place, in which Pitt and Burke advocated the repeal. "I rejoice that America has resisted," said Pitt; "if they had submitted, they would have voluntarily become slaves. They have been driven to madness by injustice. My opinion is that the stamp act should be repealed, absolutely, totally, immediately." The house of commons called to their bar, among other witnesses, Benjamin Franklin, to testify to the temper of his countrymen. Franklin told them that the colonists could not pay for the stamps for want of gold and silver; that they had borne more than their share of expense in the last war, and were still pressed by the debts contracted under it; that they were well disposed toward the mother country, but that the acts of parliament were lessening their affection, and unless those acts were repealed all commerce between them and the mother country would be broken up; and finally that they never would submit to taxes imposed by those who had no authority. These representations had due weight, and on March 18, 1766, the stamp act was repealed, and the repeal was celebrated with great rejoicings both in the colonies and in the English seaports, whose trade was already seriously affected. The plan of taxing America, however, was not yet given up, and in 1767 parliament passed an act, which received the royal assent June 29, imposing duties on paper, glass, tea, and some other articles imported into the colonies. The colonists in return revived with renewed vigor their non-importation associations. Massachusetts, and especially the town of Boston, was foremost in the opposition; and in Boston, on the occasion of the seizure of a sloop belonging to John Hancock, on whose cargo duties were demanded, a mob attacked the commissioners of customs and forced them to fly to the fort in the harbor for safety. The government resolved to take vengeance on "the insolent town of Boston," and a military force under Gen. Gage was sent to occupy the place in September. A collision took place, March 5, 1770, between the soldiers and a crowd of citizens, in which 3 of the latter were killed and 5 wounded. This "Boston massacre," as it was called, caused great excitement throughout the country, and had much influence in heightening the popular feeling against England. The soldiers who had fired were tried for murder. Two of the most distinguished of the popular leaders, John Adams and Josiah Quincy, disapproving like the vast body of the people of any resort to violence, and resolved that the struggle should be carried on purely by legal and constitutional means, undertook to defend them; and it appearing on evidence that they had fired after provocation, they were acquitted by the jury, except two, who were found guilty of manslaughter. The Virginia assembly approved the course of Massachusetts, and passed resolutions to that effect presented by Washington, and signed by him and Patrick Henry, George Mason, Thomas Jefferson, Richard Henry Lee, and all the other members. The non-importation associations of the Americans soon produced such an effect in England, that the government at length removed all the duties except that of threepence a pound on tea, which was retained at the express command of the king, who said "that there should be always one tax, at least, to keep up the right of taxing." This, however, did not satisfy the Americans, who objected not to the amount of the taxes, but to the principle of taxation without representation; and combinations were formed against the importation and use of tea, and measures taken to prevent its being either landed or sold. In Philadelphia a public meeting denounced as an enemy to his country "whosoever shall abet in unloading, receiving, or vending the tea." Similar meetings with similar resolutions were held in Charleston and New York. At Boston, on the receipt of news that ships laden with tea were on the ocean bound for that port, 5,000 men assembled on Nov. 3, 1773, and on motion of Samuel Adams resolved unanimously to send the tea back. Three ships arrived, and the consignees, yielding to the popular will, agreed to send them back if the governor, Hutchinson, would consent. The governor, though a native of the colony, was peculiarly odious from the fact that a number of his letters to England, privately instigating the ministry to pursue their oppressive course, had fallen into the hands of Dr. Franklin and been made public. He refused to permit the ships to leave the port, and the people took the matter into their own hands. On the night of Dec. 16 a band of men disguised as Indians went on board the tea ships, which lay at one of the wharfs, and, taking out the chests, emptied the tea into the water, and then quietly retired. When the news of this action reached England, the government determined to punish the colonies, and especially to make an example of Boston. Parliament accordingly passed the "Boston port bill," which closed that port to all commerce, and transferred the seat of colonial government to Salem. Bills were also passed for quartering soldiers at the people's expense on all the colonies, and enacting that officers who should be prosecuted for enforcing this law should be taken to England for trial. These acts, which were held to be gross violations of the charters and privileges of the colonies, excited to a still greater pitch the already deep indignation of the people. Boston was everywhere regarded as the champion of popular rights, and as the victim of ministerial persecution. Salem refused to become the seat of government, and Marblehead offered her port free of charge to the Boston merchants. The most distant colonies, and even the remote backwoods beyond the Alleghanies, sent money and provisions to the relief of the poor of the proscribed town. Quebec sent 1,000 bushels of wheat, and even in London £30,000 was subscribed for them. Hutchinson was superseded as governor of Massachusetts in May, 1774, by Gen. Gage, who, though personally popular, vainly strove to repress the revolutionary ferment that agitated Boston. The whigs, as those of the popular party were called, in contradistiction to the tories or royalists, carefully restrained their agitation within legal and constitutional bounds; and though Faneuil hall and the Old South church rang almost continually with the eloquence of their orators and the tumult of their meetings, nothing was done of which the British authorities could take hold. Meanwhile in all the colonies conventions were held and delegates chosen to the congress at Philadelphia, known as the "old continental congress," which met Sept. 5, to the number of 55 delegates, representing all the colonies except Georgia. Among the members were Washington, Patrick Henry, Richard Henry Lee, Edward and John Rutledge, Christopher Gadsden, Samuel Adams, John Adams, Roger Sherman, Philip Livingston, William Livingston, John Jay, and Dr. Witherspoon, president of Princeton college. For eloquence Patrick Henry was unrivalled; next to him John Rutledge was the ablest in debate; "but if you speak of solid information and sound judgment," said Patrick Henry, "Washington was unquestionably the greatest man of them all." Peyton Randolph of Virginia was chosen speaker, and Charles Thomson of Pennsylvania secretary. The discussions were opened by Patrick Henry in a speech of surpassing eloquence, in which he said: "British oppression has effaced the boundaries of the several colonies; the distinctions between Virginians, Pennsylvanians, New Yorkers, and New Englanders are no more. I am not a Virginian, but an American." A declaration of rights was agreed upon, in which was set forth the claim of the colonists as British subjects to participate in making their own laws and in imposing their own taxes, to the right of trial by jury in the vicinage, of holding public meetings, and of petitioning for redress of grievances. The maintenance of a standing army in the colonies without their consent was protested against, as were eleven acts passed since the accession of George III. in violation of colonial rights and privileges. The measures of redress which they proposed were peaceable, and comprised the formation of an "American association," pledged not to trade with Great Britain or the West Indies, nor with those engaged in the slave trade, and not to use British goods or tea. Among the papers issued by them were a petition to the king and an address to the people of Canada, written by John Dickinson of Pennsylvania; an address to the people of Great Britain, by John Jay; and a memorial to the people of the colonies, by Richard Henry Lee. When these documents reached England, William Pitt, now become earl of Chatham, said of them: "For myself, I must avow that in all my reading—and I have read Thucydides and I have studied and admired the master states of the world—for solidity of reason, force of sagacity, and wisdom of conclusion, under a complication of difficult circumstances, no nation or body of men can stand in preference to the general congress at Philadelphia. The histories of Greece and Rome give us nothing equal to it, and all attempts to impose servitude upon such a mighty continental nation must be vain." The merchants, tradesmen, and in fact a majority of the people of England, had more or less sympathy with the Americans; and even Lord North, the prime minister, by whom the obnoxious measures against the colonies were carried through parliament, in his secret heart disapproved of them, as is now known, and only remained in office and carried out the oppressive and hostile acts at the express request of the king, who was obstinately bent upon compelling the Americans to obedience by military force. Perceiving a conflict to be almost inevitable, the people of the colonies began to prepare earnestly for war, and in Massachusetts nearly all men able to bear arms were trained daily in military exercises, and engaged to take the field at a moment's notice, whence originated their name of "minute men." Gen. Gage, who had received some additions to his forces, became alarmed, and began to fortify Boston neck, and to seize all the arms and ammunition he could lay hands on in the surrounding towns. Small stores of arms and ammunition had been accumulated by the provincial government of Massachusetts at Worcester and at Concord. Gage, on the night of April 18, 1775, secretly despatched a large force to destroy the stores at Concord. The movements of the British were however vigilantly watched, and the minute men were roused in every direction by messengers and signals from Boston. At Lexington, half way between Boston and Concord, the first blood of the revolution was shed. Major Pitcairn ordered the soldiers to fire upon the citizens who appeared in arms upon the common, and 8 were killed and several wounded. The British proceeded to Concord, and destroyed some stores, but met with such resistance at the north bridge over Concord river that they were forced to retreat, and, hotly pursued by the Americans, made their way back to Boston with a loss of 273 killed and wounded. "This," says Bancroft, "is the world-renowned battle of Concord, more eventful than Agincourt or Blenheim." It brought the political contest between the colonies and England to a summary ending, and inaugurated the war of the revolution. "Before the 19th of April, 1775," relates Jefferson, "I never had heard a whisper of a disposition to separate from Great Britain." Six months before, in Oct. 1774, Washington wrote: "No such thing as independence is desired by any thinking man in America;" and little more than a month before the battle John Adams had publicly declared in Boston: "That there are any who pant after independence is the greatest slander on the province." The tidings of the fight spread with wonderful rapidity while it was going on, and everywhere throughout New England the people sprang to arms. The night preceding the outrages at Lexington, there were not 50 people in the whole colony who ever expected that any blood would be shed in the contest; the night after, the king's governor and the king's army found themselves closely beleaguered in Boston. The provincial congress of Massachusetts on April 22 resolved unanimously that a New England army of 30,000 men should be raised, of which the quota of Massachusetts should be 13,600. Before the end of the month 20,000 men were encamped around Boston. As the news from Concord and Lexington spread westward and southward, the people everywhere rose in arms, and before the close of summer the power of all the royal governors from Massachusetts to Georgia was at an end. Not only before Boston, but on the remotest frontiers, the New Englanders acted with spirit and energy. Volunteer expeditions from Connecticut and Vermont, led by Benedict Arnold and Ethan Allen, seized the important fortresses of Ticonderoga and Crown Point, whose cannon and ammunition were of incalculable value to the poorly equipped forces of America. Equally bold steps were taken in Virginia, South Carolina, and Georgia; while in North Carolina a convention assembled at Charlotte, Mecklenburg co., in May, 1775, proclaimed their constituents absolved from all allegiance to the British crown, and organized a local government with preparations for military defence. The second continental congress assembled May 10 at Philadelphia. Among the members were Franklin, Hancock, Samuel Adams, John Adams, Washington, Richard Henry Lee, Patrick Henry, Jay, George Clinton, and Robert R. Livingston. Hancock, who with Samuel Adams had been proscribed as a rebel, was elected president. Conservative and moderate to the last, the congress sent yet another petition to the king, denying any intention of separation from England, and asking only for redress of grievances; but at the same time they formed a federal union of the colonies, and assumed the central authority of the nation. They took measures to raise an army, to equip a navy, and to procure arms and ammunition. Bills of credit to the amount of $2,000,000 were issued, for whose redemption the faith of the "united colonies" was pledged. The forces before Boston were adopted as the continental army, and at the suggestion of the New England members Washington was nominated and unanimously chosen as commander-in-chief. Before he could reach the seat of war important events occurred. The British army in Boston had received large reënforcements, led by Generals Howe, Burgoyne, and Henry Clinton, who formed the plan of seizing and fortifying Bunker hill in Charlestown. The American generals, informed of this project, frustrated it by despatching a force under Col. William Prescott, who interpreted his instructions to mean Breed's hill, which more fully than Bunker hill commanded Boston harbor. A redoubt hastily thrown up in the night met the eyes of the British at daybreak on the morning of June 17, and immediate preparations were made for its assault. Three thousand veteran soldiers were landed, and, after being twice repulsed by about half their number of imperfectly armed Americans, and after the ammunition of the latter was exhausted, carried the works with a loss, according to their own account, of 1,054 men killed and wounded. The American loss was 449 killed, wounded, and prisoners. Among the killed was Gen. Joseph Warren of Boston, one of the ablest, most eloquent, and most popular of the patriot leaders. The battle of Bunker hill was the first great conflict of the revolution, and, though nominally a defeat, soon came to be universally considered a victory of the Americans, on whose opinion of their own ability to meet the British soldiers in open fight it had a favorable influence that was felt throughout the war. Four days after the battle Washington, accompanied by Charles Lee, who had been made a major-general, started from Philadelphia for the seat of war, where on his arrival he was received with great enthusiasm by the army. Beside Lee, Philip Schuyler of New York, Artemas Ward of Massachusetts, and Israel Putnam of Connecticut had been elected major-generals. Horatio Gates, Seth Pomeroy, Richard Montgomery, David Wooster, William Heath, Joseph Spencer, John Thomas, John Sullivan, and Nathanael Greene were chosen brigadiers. The army was unorganized, undisciplined, poorly clad, imperfectly armed, and almost destitute of powder. With the aid of Gates, who almost alone of the generals had had much experience in war, Washington brought the troops into tolerable order, and regularly beleaguered Boston till March 17, 1776, when the British evacuated the city and sailed for Halifax, carrying with them a large body of loyalists. Meantime an invasion of Canada, whose inhabitants were reported to be disaffected to British rule, was decided upon by congress, and carried out with insufficient forces under command of Gen. Montgomery. Montreal was taken, and Quebec was attacked Dec. 31, 1775, in its upper part, by one portion of the army led by Montgomery, while another under Arnold assailed it in the lower at the same time. The assault was conducted with great courage and energy, but was repulsed and Montgomery slain and Arnold severely wounded. After a blockade of the city continued for some months, the Americans, whose forces were totally inadequate in numbers and equipments to the enterprise, on the arrival of powerful reënforcements to the British, abandoned the province in June, 1776. During this period the British fleets and cruisers hovered on the coast, attacking various points; among others, Falmouth (now Portland), Me., which they burned, and Charleston, S. C., where they were repulsed with great loss by a small force in Fort Sullivan, commanded by Col. Moultrie. In all these operations the Americans were greatly impeded by want of powder and other munitions of war. Cruisers, however, were fitted out by order of congress and by some of the colonies, and several of the British supply ships were opportunely captured. Congress also appointed a secret committee to import supplies from the West Indies, and took measures to establish powder mills and cannon founderies. They also appointed a naval committee with authority to build 13 frigates, which may be considered the foundation of the navy department of the United States. A secret committee appointed to correspond privately with the friends of the colonies in Europe may be regarded likewise as the germ of the state department. A financial committee and a war committee had already been instituted, and thus the main departments of the government of the united colonies were put in operation. The success of the colonial armies at Boston and at Charleston, and the outrages committed by British commanders on the coast and in Virginia, greatly stimulated the feeling in favor of independence, which Samuel Adams and a few others had desired from the beginning of the contest; and a powerful impulse was given to this sentiment by the "Common Sense" of Thomas Paine, which was issued about the beginning of 1776 and widely circulated. On June 7 Richard Henry Lee introduced a resolution into congress declaring "that the united colonies are and ought to be free and independent states, and that their political connection with Great Britain is and ought to be dissolved." After an animated discussion, the resolution passed by the votes of 9 colonies. Pennsylvania and South Carolina voted against it, Delaware was divided, and New York did not vote. Franklin, Jefferson, John Adams, Roger Sherman, and Robert R. Livingston were chosen a committee to draft a declaration of independence, which was written by Jefferson, and was adopted on July 4 by the vote of the 13 colonies, which thus became the United States of America. "The declaration was not only the announcement of the birth of a people," says Bancroft, "but the establishment of a national government; a most imperfect one, it is true, but still a government, in conformity with the limited constituent powers which each colony had conferred upon its delegates in congress. The war was no longer a civil war; Britain was become to the United States a foreign country. Every former subject of the British king in the 13 colonies now owed primary allegiance to the dynasty of the people, and became citizens of the new republic; except in this, every thing remained as before; every man retained his rights; the colonies did not dissolve into a state of nature, nor did the new people undertake a social revolution. The affairs of internal police and government were carefully retained by each separate state, which could, each for itself, enter upon the career of domestic reforms. But the states, which were henceforth independent of Britain, were not independent of one another; the United States of America assumed powers over war, peace, foreign alliances, and commerce." Soon after the evacuation of Boston by the British, Washington had transferred his army to the city of New York, which it was feared would be the next object of attack. On June 28 a fleet from Halifax, bearing Gen. Howe and the late garrison of Boston, entered New York harbor, and landed the forces on Staten island. A few days later arrived Admiral Lord Howe, to whom, in conjunction with his brother Sir William, the king had intrusted the control of American affairs. He issued a circular offering pardon to those who would lay down their arms and submit to the royal mercy. As the Americans had committed no crime in maintaining their rights, they had no need for pardon; and congress ordered the circular to be published in all the newspapers to show the people that the king meant to concede nothing, and that they must either fight or be slaves. The mission of Lord Howe came to nothing, and both sides prepared with vigor for the prosecution of hostilities. The British government, unable to recruit the army to the desired number from its own people, who disapproved the war, had hired from the German princes, and especially from Hesse-Cassel, large bodies of mercenaries; and with these and fresh troops brought from the south by Sir Henry Clinton, the force on Staten island was augmented to 30,000 men. Washington's army was much less in numbers, and every way inferior in supplies and equipments. The campaign began on Long island, where on Aug. 27 the Americans were defeated with heavy loss, and forced to abandon that island, and soon after the city of New York and the lower Hudson. A series of disasters ensued, and at the end of the year Washington had been compelled to retreat beyond the Delaware at the head of fewer than 4,000 men, poorly clad, half starved, and destitute of blankets and tents. The cause of freedom looked desperate, and great discouragement prevailed throughout the country. Washington, however, was firm and undaunted. He declared to Gen. Mercer that, even if driven beyond the Alleghanies, he would stand to the last for liberty and independence. While these disasters were occurring between the Hudson and the Delaware, the British seized and held the island of Rhode Island, and at Baskingridge, N. J., captured Gen. Charles Lee, who was esteemed one of the best officers in the army, though it is now known that he was treacherous to the cause, and had been for some time before his capture disposed to an accommodation with the enemy. The army under Washington was reduced by losses in battle and by the expiration of enlistments to about 3,000 men, and in the general despondency numbers of the people abandoned the cause as hopeless, and accepted the British commander's offers of pardon and amnesty. Washington, however, maintained his fortitude and confidence in final success, and vigilantly watched for an opportunity to retrieve the credit of the American arms. The indolence and caution which were prominent traits in the character of Gen. Howe, the British commander-in-chief, prevented him from crushing as he might have done the weakened remnant of Washington's army, and gave time to the daring and enterprising American to strike a severe blow at his over-confident antagonist. On the night of Dec. 25 Washington crossed the Delaware in open boats despite the snow and ice, and falling upon the British forces at Trenton captured 1,000 Hessians. A few days later (Jan. 3, 1777) he defeated the enemy again at Princeton, taking several hundred prisoners. These exploits revived the spirits of the nation, and confounded and dismayed the enemy. Congress had manifested unusual firmness in this trying period, had invested Washington with almost dictatorial powers, and had taken measures for raising an army for three years instead of for one. It now formed articles of confederation between the states (which were ratified by all except Maryland in 1778-'9), and sent agents to Europe to solicit aid from foreign powers. When the campaign opened in the spring of 1777, Washington's force had increased to 7,000 men. Gen. Howe, after vainly attempting to bring on a general engagement, withdrew his forces from New Jersey to Staten island, and afterward sailed with 16,000 men for the Chesapeake, where he landed on Elk river and threatened Philadelphia. To defend the capital Washington was forced to give battle on the Brandywine, Sept. 11, but was overpowered by superior forces and compelled to retreat with the loss of nearly 1,000 men. Lafayette, who had recently entered the service of the United States as a volunteer, and had been made a major-general, was severely wounded on this occasion. A few days later the British took possession of Philadelphia without opposition, congress retiring first to Lancaster and afterward to York, Penn. On Oct. 4 Washington made an attack on the British at Germantown, 7 miles from Philadelphia, but was repulsed with heavy loss; and soon afterward both armies went into winter quarters. The want of success in the middle states was more than counterbalanced by victories in the north. A British army 7,000 strong, beside Canadians and Indians, commanded by Gen. Burgoyne, advanced from Canada by Lake Champlain, and took Ticonderoga and Skenesborough, now Whitehall. From Fort Edward, on the upper Hudson, strong detachments were sent to Bennington, Vt., to destroy a collection of stores, but were met and defeated with the loss of 600 men by the Vermont and New Hampshire militia led by Gen. Stark. Burgoyne made his way through the woods to Saratoga, where he was encountered by Gen. Gates, who had recently been placed in command of the army in the northern department; and on Sept. 19 an indecisive engagement was fought at Stillwater, in which the British lost about 600 men. On Oct. 7 a second battle was fought on nearly the same ground, in which the Americans had the advantage; and 10 days later Burgoyne with his whole army capitulated on favorable terms. The consequences of this victory were of the highest importance at home and abroad. At home, it inspired the people with confidence; it depressed the tories or loyalists, who in some of the states were yet numerous, and raised the bills issued by congress 20 per cent. in value. Abroad, the victory of Saratoga had an equally favorable effect. From the beginning of the conflict the French government had secretly encouraged the revolt of the colonies, and had furnished them with supplies of arms and military stores, without which it would have been almost impossible to carry on the war. Franklin, Silas Deane, and Arthur Lee had been sent by congress as commissioners to France shortly after the declaration of independence, but received no open countenance from the court till after the surrender of Burgoyne. That event, and the prospect it opened of final success to the Americans, decided the negotiations in their favor; and in Feb. 1778, treaties of alliance and of amity and commerce were signed at Paris. Alarmed at this alliance and at the fate of their northern army, the British ministry introduced into parliament two bills, which were passed March 11, 1778, repealing all the acts obnoxious to the Americans; and subsequently three commissioners were sent with authority to negotiate terms of reconciliation. Congress, however, finding that these bills made no mention of the independence of the colonies, rejected them, and refused to treat with the commissioners until Great Britain should agree to withdraw her fleets and armies. Washington went into winter quarters about the middle of Dec. 1777, at Valley Forge, 20 miles north of Philadelphia, his half clad and scantily fed soldiers marching many of them without shoes, and leaving bloody footprints on the snow. They suffered dreadful hardships during the extremely severe winter of 1777–'8, but in the spring were cheered with the tidings of the alliance and assistance of France, in whose honor on May 7 they fired salutes amid huzzas for King Louis XVI. A month later a French fleet under Count D'Estaing, which had been sent to blockade the British fleet in the Delaware, reached the coast; but a few days before its arrival the enemy's vessels had sought refuge in Raritan bay. Sir Henry Clinton, who succeeded Howe as commander-in-chief of the British, evacuated Philadelphia in June, and with 11,000 men began on the 18th his march toward New York. Washington pursued with a nearly equal force, and on the 28th the two armies engaged in battle on the plains of Monmouth, near the village of Freehold, N. J. The action was not decisive, but the Americans remained masters of the field, while the British retreated to New York and remained inactive for the rest of the summer. An attempt made in August with the assistance of the French fleet to drive the British from Rhode Island proved a failure, and D'Estaing, without having accomplished any thing of importance, sailed for the West Indies. At the close of the campaign of 1778 the position of the British was not at all advanced from that which their forces held in 1776. They occupied nothing but Rhode Island and the island of Manhattan, while the Americans had gained largely in knowledge of the art of war, and had secured the powerful alliance of France and the sympathies and secret assistance of the Spanish court. Little practical benefit, however, had been gained from the mismanaged operations of the French fleet, and great embarrassment was felt from the wretched condition of the national finances, the continental money issued by congress having depreciated to a very low point. In this emergency the patriotism and the financial skill and credit of Robert Morris were of the highest value to the government, which without his aid could scarcely have continued in existence. In 1779 the principal theatre of war was at the south, where Gen. Benjamin Lincoln commanded the Americans. Toward the end of 1778 Gen.

Clinton had sent an expedition to Georgia, which defeated the American forces at Savannah, and took possession of the city, Dec. 29. The British were successful in several subsequent engagements, and by the middle of summer, 1779, Georgia was conquered and completely possessed by them. An attack on Savannah, made by Lincoln with the coöperation of the French fleet in September, was repulsed with the loss to the allies of 1,000 men, among them Count Pulaski. During this summer Lafayette had visited France, and chiefly through his efforts the French government had agreed to send another fleet and an army to the assistance of the Americans. The British ministry, informed of this expedition, ordered Clinton to withdraw his troops from Rhode Island and concentrate all his forces at New York. England in fact was becoming involved in difficulties of an alarming character. Spain had declared war against her, June 16, 1779, and a French and Spanish armament threatened an invasion, while French and American cruisers hovered on her coasts, insulting her ports and harassing her commerce. The famous Paul Jones, commanding an American frigate, captured on Sept. 23 two British ships of war, in one of the most desperate naval battles ever fought. During the whole war in fact Paul Jones was actively employed against the enemy on the sea, and, together with a swarm of privateers from New England, inflicted immense loss on the mercantile marine of England. About the beginning of 1780 Clinton, leaving the Hessian general Knyphausen in command at New York, sailed south with the main body of the British army to carry the war into the Carolinas. Charleston was besieged for several weeks, and Gen. Lincoln after a feeble defence surrendered May 17, with a garrison of 2,500 men. The rest of the state of South Carolina was overrun by detachments of the British, and nominally submitted to the restoration of the royal authority, so that Clinton, deeming his conquest complete, sailed for New York June 5, leaving Lord Cornwallis in command. Very soon, however, the patriots, though unable to take the field in force, renewed the contest as guerillas under the command of Sumter, Marion, Pickens, and other daring partisan leaders, and continually harassed not only the British but the tories, of whom there were great numbers in the state. To recover South Carolina, congress sent Gen. Gates, whose capture of Burgoyne's army at Saratoga had given him a higher reputation than he deserved. On his first encounter with Cornwallis at Camden, Aug. 16, he was routed with the loss of nearly 1,000 men, among them Baron De Kalb, a French officer of experience, who was second in command. Gates with the remnant of his force fled to North Carolina, and at the close of the summer there remained no Americans in arms in South Carolina except a small band under Marion. Within three months two American armies had been destroyed, while the most formidable of the partisan bands, that of Sumter, had been dispersed by Col. Tarleton. Early in September Cornwallis marched into North Carolina, where on Oct. 7, at King's mountain, a detachment from his army was totally defeated by the militia, who killed and captured upward of 1,200 of the enemy. This serious reverse, and the renewed activity of Marion, Pickens, and other partisan leaders, induced Cornwallis in October to withdraw to South Carolina. During the summer the only military operation of importance in the north was an irruption of the British into New Jersey, from which, after vainly endeavoring to draw Washington with his inferior forces into a general engagement, and receiving from Gen. Greene a severe defeat at Springfield, June 23, they retired to their strong position at New York. A few days later, July 10, a French fleet arrived at Newport, bringing the count de Rochambeau and 6,000 soldiers to the assistance of the Americans. Washington went to Hartford in September to confer with the French officers, and during his absence it was discovered that Benedict Arnold, who commanded the important fortress of West Point, had engaged in treasonable correspondence with the enemy, and had agreed to deliver that stronghold and its dependencies into the hands of Sir Henry Clinton. The traitor Arnold escaped, but Major André, the British officer who communicated with him, was caught and hanged as a spy. The end of the year was marked by a declaration of war from Great Britain against Holland, on discovering that the Dutch government was secretly negotiating a treaty of alliance with the United States. The principal military operations of the campaign of 1781 were in the south, where Greene had been made commander in place of Gates. At Cowpens, S. C., on Jan. 17, Gen. Morgan won a brilliant victory over the British under Col. Tarleton. On March 15, at Guilford Court House, N. C., a battle was fought in which the British gained some advantage; but in September they were defeated at Eutaw Springs in a bloody action which nearly terminated the war in South Carolina. At the close of the year the British in the states south of Virginia were confined to Charleston and Savannah. In Virginia Cornwallis, who was opposed by Lafayette, Wayne, and Steuben, had fortified himself at Yorktown, where he had gathered a considerable army. Meanwhile the American army of the north under Washington, and the French army of Count de Rochambeau, had formed a junction on the Hudson for the purpose of attacking the British in New York. This plan however was suddenly changed, and while the British commander, Sir Henry Clinton, was kept from sending aid to Cornwallis by apprehensions that New York was still threatened, the allied army was far on its way toward Yorktown, where it arrived about 12,000 strong, Sept. 28, 1781, and began a regular siege, which lasted till Oct. 19, when Cornwallis surrendered with his whole force of 7,000 men. This victory substantially terminated the contest, and secured the independence of America. In England Lord North received the intelligence "as he would have done a cannon ball in his breast," exclaiming: "O God! it is all over! it is all over!" He and his administration were forced to retire from power, March 20, 1782, and give way to a cabinet opposed to the further prosecution of the war. Orders were sent to the British commanders in America to cease hostilities, and on July 11, 1782, Savannah was evacuated, and Charleston on Dec. 14. Adams, Franklin, Jay, and Laurens were appointed by congress commissioners to negotiate for peace; and at Paris, on Nov. 30, 1782, they signed a preliminary treaty, and on Sept. 3, 1783, a definitive treaty, by which the United States were formally acknowledged by Great Britain to be free, sovereign, and independent. New York, the last position held by the British on our coast, was evacuated Nov. 25, 1783. Thus ended a war which, in the language of the younger Pitt, "was conceived in injustice, nurtured in folly, and whose footsteps were marked with slaughter and devastation. The nation was drained of its best blood and its vital resources, for which nothing was received in return but a series of inefficient victories and disgraceful defeats; victories obtained over men fighting in the holy cause of liberty, or defeats which filled the land with mourning for the loss of dear and valuable relations, slain in a detested and impious quarrel." In the 7 years of the revolutionary war Great Britain sent to America 112,584 soldiers and more than 22,000 seamen. The forces raised by the United States during the same period consisted of 230,000 continental soldiers and about 56,000 militia. At the close of the war serious trouble broke out with the army concerning the payment of the arrears of their wages and rations. The paper money issued by congress, in which the troops were paid, had so depreciated as to be of little value, and, the treasury being empty payment in gold and silver was almost out of the question. The wide-spread disaffection among the soldiers was greatly fomented by an address written by Major John Armstrong, which in March, 1783, was circulated in the camps at Newburg, N. Y., urging the army to take matters into their own hands and compel congress and the people to do them justice. The great influence of Washington, however, was promptly exerted, and successfully allayed this alarming discontent; and congress soon after satisfied the troops by partially paying their claims. On Nov. 2 Washington issued a farewell address to the armies of the United States, and, after taking leave on Dec. 4 of his officers at New York, proceeded to Annapolis, Md., where congress was then in session, and on Dec. 23 resigned his commission as commander-in-chief and retired to his estate at Mount Vernon.—It was soon found that the articles of confederation adopted in 1778 did not form a sufficient constitution for the nation, and that they were especially deficient in relation to the subjects of legislation which concerned the whole country, such as the regulation of commerce, the common defence, the adjustment of controversies between the states, and the making of treaties with foreign nations. Some of the states passed laws which conflicted with those of other states; some levied duties on merchandise at the expense of their neighbors; and adjacent ports in different states competed with each other by lowering the rate of imposts, as congress had no authority to regulate commerce or to legislate for the whole country. These and other evils flowing from the absence of a powerful general government grew at length so burdensome, that a national convention was called, which met at Philadelphia May 14, 1787, and after 4 months' deliberation adopted the present constitution of the United States, and submitted it to the people for ratification. After a thorough discussion, lasting in some of the states for 2 or 3 years, the constitution was accepted by all of them; first by Delaware, Dec. 7, 1787, and lastly by Rhode Island, May 27, 1790. When two thirds of the states had adopted the constitution, it became valid, and went into operation March 4, 1789. New York was designated as the capital, and in that city Washington, who was unanimously chosen the first president, was inaugurated on April 30, with John Adams as vice-president. He appointed Jefferson secretary of state, Hamilton of the treasury, and Henry Knox of war. The beneficial influence of the new government was immediately felt in the restoration of public confidence, the revival of commerce, and the general prosperity of the country. A system of finance, advocated in an able report by Hamilton, was adopted, and the debts of the late confederacy and of the individual states were assumed by the general government. A bank of the United States was incorporated, which began its operations in Feb. 1794, and a mint was established at Philadelphia. In the summer of 1790 an Indian war of an unusually formidable character was waged by the tribes of the northwest, who, after inflicting several defeats on Gens. Harmer and St. Clair, were finally quelled by Gen. Wayne, and peace was restored in Aug. 1795. The great revolution in France, which broke out at the beginning of Washington's administration, was powerfully felt in its principles and effects in this country. Claims for assistance were made upon the United States, and a large part of the people, in their intense sympathy with the French republic and hostility to England, would have gladly seen the United States actively engaged in the quarrel which raged beyond the Atlantic. Two parties had already been formed, viz.: the federalists, composed of those who favored the maintenence of the constitution just as it was; and the republicans or democrats, who desired to introduce amendments to limit the federal power, and to increase that of the states and the people. Washington, Adams, Hamilton, and Jay were accounted among the federalists; while Jefferson, Madison, Gallatin, and Edward Livingston were among the leaders of the republicans. The federal party on the French question advocated a strict neutrality, while the republicans freely avowed their sympathy for France, and their willingness to aid the French republic in its struggle with the European monarchies. Party spirit ran high on this point, yet at the second presidential election in 1792 Washington again received the unanimous votes of the electoral colleges. Adams was reëlected vice-president, receiving 77 votes, while George Clinton, the republican candidate, received 50 votes. In April, 1793, Citizen Genet arrived in America as minister from the French republic, and made such efforts to involve the United States in war with Great Britain, that Washington at length demanded his recall of the French government, and another minister was sent in his place. Notwithstanding, however, the moderation of the executive, the party feeling on the French and English question was exceedingly violent among the people and in congress, where in both houses parties were nearly equally divided. The feeling against Great Britain was strongly stimulated by the obnoxious conduct of the British government in retaining possession of forts in the west to which their title had been ceded by the treaty of 1783, and in seizing American vessels and impressing American seamen. After in vain remonstrating against these outrages, the president, sincerely anxious to avoid war, sent John Jay as a special envoy to England, where, in Nov. 1794, a treaty was concluded, which was regarded by the republicans as so favorable to England that the requisite confirmation by the senate was obtained with difficulty, and its promulgation among the people raised an extraordinary clamor against Jay and the president, which however soon subsided. After a full discussion, in the course of which Fisher Ames made his celebrated speech on the British treaty, the house of representatives, in which there was a majority in opposition to the administration, passed the act for carrying the treaty into effect by a vote of 51 to 48. This settled the dispute with England, but the ratification of the treaty exasperated the French government, which openly showed its displeasure by decrees under which American commerce suffered continual annoyances and losses, and by insults to Mr. Pinckney, the American minister at Paris. Among the important domestic events of Washington's administration were the admission into the Union of the new states of Vermont (1791), Kentucky (1792), and Tennessee (1796), and the whiskey insurrection against an unpopular excise law, which in 1794 threw western Pennsylvania into confusion, but was energetically suppressed by the president, who called out 15,000 militia for the purpose. On the approach of the third presidentail election, Washington was earnestly pressed to become a candidate for another term, and would doubtless have been unanimously reëlected; but he positively declined, and issued, in Sept. 1796, a "Farewell Address," in which he urged his countrymen to adhere to the principles upon which he had endeavored to conduct his administration, and upon which alone in his judgment could the liberty and happiness of the United States be firmly based. The universal veneration for Washington had in a measure curbed the manifestations of party spirit at the two elections in which he had been a candidate; but on his withdrawal from the canvass, the two great parties at once arrayed themselves against each other with a bitterness of zeal never since equalled. The federalists supported John Adams and the republicans Thomas Jefferson for president, and the result was that Adams, who received 71 electoral votes, was chosen president, while Jefferson, who received 68, the next highest number, became, by the requisitions of the constitution as it then was, the vice-president. The two next highest candidates were Thomas Pinckney and Aaron Burr. The new president selected as his cabinet Timothy Pickering, secretary of state; Oliver Wolcott, of the treasury; James McHenry, of war; and Charles Lee, attorney-general. In 1798 the navy department was created, and Benjamin Stoddart made secretary. The relations between France and the United States were of so threatening a character, that one of the first acts of President Adams was to convene congress in extra session, May 15, 1797. Three envoys, C. C. Pinckney, Elbridge Gerry, and John Marshall, were sent to France with authority to adjust all difficulties. The French government refused to receive them, but intimated that a considerable present of money would greatly facilitate negotiations, and that a refusal to pay the bribe would lead to war. "War be it, then," replied Pinckney; "millions for defence, but not a cent for tribute." Pinckney and Marshall, who were federalists, were ordered to quit France; but Gerry, who was a republican, was allowed to remain. The insult to their envoys excited great indignation in the United States, and congress made preparations for war. The army and navy were enlarged, and Washington was appointed commander-in-chief, with the rank of lieutenant-general. Hostilities actually began on the ocean, the U. S. frigate Constellation capturing a French frigate in the West Indies, and subsequently disabling another of superior force in an action lasting 5 hours. The decided measures adopted by the United States were not without effect on the French government, and overtures were made to the president for a renewal of negotiations. An embassy was sent, and Napoleon Bonaparte having attained to power, a treaty was promptly concluded, Sept. 30, 1800, and peace between the two countries reëstablished. During these troubles with France two acts were passed by congress, known as the alien and sedition laws, the first empowering the president to order aliens who were conspiring against the peace of the United States to quit the country, and the other restricting the liberty of speech and of the press. The alien law was defended on the ground that the country swarmed with French and English emissaries, whose mission was to embroil the United States with European quarrels; while the apology for the sedition law was the unquestionable licentiousness of the press, which at that time was chiefly conducted by refugees and adventurers from Great Britain and Ireland. Nevertheless these laws became exceedingly unpopular, and were bitterly denounced as harsh and unconstitutional. They contributed largely to the dissatisfaction with Mr. Adams's administration, which prevailed especially in the South and West, and which led in the next presidential election to the success of the republican candidates, Jefferson and Burr, each of whom received 73 votes, while Mr. Adams, who was a candidate for reëlection, received but 65. The tie in the votes for Jefferson and Burr threw the election into the house of representatives, where on the 36th ballot Jefferson was chosen president and Burr vice-president. This contest led to an amendment of the constitution, by which, instead of the original article which required the electors of president and vice-president to vote for two persons for those offices, of whom the one who had the highest number of votes was to be president, an article was substituted requiring the electors to designate which person was voted for as president and which as vice-president. This amendment, which forms the 12th article of the amendments to the constitution, was announced by the secretary of state as adopted and ratified Sept. 25, 1804, it having been approved by all the states except Massachusetts, Connecticut, and Delaware. Very soon after his inauguration President Jefferson began to remove federalists from office and appoint democrats in their stead. He justified this policy on the ground that during the administration of Mr. Adams none but federalists had been appointed, and that it was not just that one party should have a majority of offices. Scarcely any vacancies existed except those created by removal; "those by death are few, by resignation none." The removals made by him for political reasons, however, were very few compared to the wholesale changes which afterward came to be the practice. His cabinet consisted of James Madison, secretary of state; Henry Dearborn, of war; Albert Gallatin, of the treasury; Robert Smith, of the navy; and Levi Lincoln, attorney-general. For the most part his administration was marked by vigor and enlightened views, and he was reëlected for a second term with little opposition, his competitor, C. C. Pinckney of South Carolina, receiving only 14 votes. During his first term Ohio was admitted (1802), and Louisiana was purchased of France in 1803, and two territories formed of it, called the territory of Orleans and the district of Louisiana. The insolence of the piratical states on the Barbary coast was humbled by the bombardment of Tripoli in 1804, and by the invasion of that state by a small force led from Egypt by Capt. Eaton, an American officer, which led to a satisfactory treaty in 1805. Mr. Jefferson's second term began March 4, 1805. In the following year Aaron Burr, who had been succeeded as vice-president by George Clinton, secretly organized, chiefly in the western states, a military expedition which excited the suspicion of the government, and led to his arrest and trial at Richmond in 1807 on a charge of attempting to dismember the Union and to establish an independent dominion west of the Alleghanies; but no overt act being proved against him, he was acquitted by the jury. The amicable relations which had existed between the United States and Great Britain for several years began in 1806 to be disturbed by the injuries inflicted on American commerce through the operation of an order in council of the British government declaring the whole coast of Europe, from the Elbe to Brest, to be in a state of blockade; an order which Napoleon retaliated by declaring in a decree issued at Berlin, Nov. 21, 1806, a blockade of all the ports of the British islands. Another order of the British government, Jan. 7, 1807, prohibited all coast trade with France. Under these orders and decrees great numbers of American vessels were seized by French and English cruisers, and our foreign commerce, which had attained extraordinary prosperity from the neutral position of the country, was nearly destroyed. The irritation against Great Britain produced by her depredations on our commerce was greatly increased by her persistent assertion of the right to search American vessels for suspected deserters from her navy, a right continually exercised by her cruisers in the most offensive manner, and in the practice of which multitudes of native-born American seamen were forced into the British navy. The insolence of the British naval officers was at length carried so far that in June, 1807, the U. S. frigate Chesapeake was stopped near the entrance to Chesapeake bay by the English man-of-war Leopard, and on the refusal of her commander to submit to a search was fired into, and 21 of her crew killed or wounded. Four alleged deserters were then taken from her, three of whom proved on investigation to be native Americans. This outrage, for which immediate reparation was demanded by the president, was not atoned for till 4 years later, and even then the right of search was still claimed by the British government, and eventually became a cause of war. Another order in council was issued Nov. 11, 1807, forbidding neutral vessels to enter French ports until they had previously stopped at a British port and paid a duty. This was answered in December of the same year by Napoleon's Milan decree, confiscating every vessel which should submit to British search or pay any duties whatever to Great Britain. In the same month congress, on the recommendation of the president, laid an embargo, which detained all vessels, foreign or American, in our ports, and ordered all American vessels to return immediately home. This measure was vehemently denounced by the federal party, and for a time it prostrated the shipping and commercial interests of the United States. It was repealed in Feb. 1809, just before the expiration of the president's second term. Although solicited by addresses from the legislatures of several states to serve a third term, Mr. Jefferson declined, and the republican, or, as it was now often called, the democratic party, supported James Madison for president, and George Clinton for vice-president. Madison and Clinton were elected, the former receiving 122 votes and the latter 113, while the federal candidates, C. C. Pinckney and Rufus King, received each 47. The states which supported the federal candidates were New Hampshire, Massachusetts, Rhode Island, Connecticut, and Delaware; and two districts in Maryland and three in North Carolina also chose federal electors. The ruinous operation of the embargo law had considerably weakened the democratic party, particularly in the commercial middle and eastern states, and Mr. Jefferson went out of office warmly denounced by one portion of the people, and as warmly praised by another and more numerous party. His friends on the one hand claimed that his administration had accomplished for the nation the acquisition of Louisiana with more than 1,000,000 square miles of territory, and the free navigation of the Mississippi, which also settled a troublesome controversy with Spain, and removed the dangerous neighborhood of France; and that it had upheld the dignity of the republic in its controversies with England, and had compelled the Barbary powers to respect the flag of the United States. The position of the opponents of Mr. Jefferson at the same time is given in the following picture of the state of the country, drawn by a committee of the Massachusetts legislature in Jan. 1809: "Our agriculture is discouraged; the fisheries abandoned; navigation forbidden; our commerce at home restrained if not annihilated; commerce abroad cut off; our navy sold, dismantled, or degraded to the service of cutters or gunboats; the revenue extinguished; the course of justice interrupted; and the nation weakened by internal animosities and divisions at the moment when it is unnecessarily and improvidently exposed to war with Great Britain, France, and Spain." Mr. Madison formed his cabinet as follows: Robert Smith, secretary of state; William Eustis, secretary of war; Paul Hamilton, secretary of the navy; Albert Gallatin, secretary of the treasury; and Cæsar A. Rodney, attorney-general. Congress met in May, 1809, in extra session, and continued with some modifications the non-intercourse act with Great Britain and France, which was again modified about a year later. A long negotiation was carried on with the English government on the subject of this act, the orders in council, and the right of search, which resulted only in augmenting the unfriendly feeling between the two countries. The British government adhered tenaciously to its policy relating to neutrals, and American vessels and their cargoes continued to be seized by British cruisers and condemned in British admiralty courts. No alternative was left to the United States but war; and though the president was exceedingly averse to forcible measures, the pressure of public opinion, and the influence of Clay, Calhoun, Lowndes, and other leaders of the war party, at length induced him to acquiesce reluctantly in a declaration of hostilities. He sent to congress, June 1, 1812, a message on the subject of the aggressions of Great Britain, which was referred to the committee on foreign relations in the house of representatives, who on June 3 reported a manifesto as the basis of a declaration of war, for these reasons: the impressment of American seamen by the commanders of British ships of war; the British doctrine and system of blockade; the orders in council; and, lastly, various depredations committed by English subjects on the commerce of the United States. The house adopted the measure by a vote of 79 to 49, and the senate by a vote of 19 to 13; and on June 18 the president signed the act declaring war. Five days later the British government revoked its orders in council, a step which, if taken a little earlier, would have doubtless prevented the outbreak of hostilities. Great Britain was at this time engaged in her tremendous struggle with Napoleon, and gave not much thought or effort to affairs on this side of the Atlantic. For several months after the declaration of war the British government did little toward counter hostilities. The blockade of the Chesapeake and the Delaware was not proclaimed till Dec. 26, 1812, and British naval forces did not appear on the American coasts in any formidable power till Feb. 1813. On March 20, 1813, the whole coast of the United States was declared to be in a state of blockade, with the exception of the coasts of the federal states of New England, a distinction obviously made with the view of widening the dissension between the federal and democratic parties. But although the United States had the advantage that the main force of their enemy was occupied by the great European conflict, their own preparation for the contest was in every respect inadequate. The treasury was almost empty, the revenue having been nearly ruined by the non-importation acts and embargoes; the army numbered but 10,000 men, one half of them raw recruits, and was very deficient in officers of experience; while the navy comprised only 8 frigates, 2 sloops, and 5 brigs. Congress, however, authorized the president to enlist 25,000 regulars and 50,000 volunteers. Henry Dearborn, who had served with credit in the war of the revolution, was appointed major-general and commander-in-chief, and James Wilkinson, Wade Hampton, William Hull, and Joseph Bloomfield were appointed brigadiers. Long before war was declared British emissaries had been engaged in exciting the north-western Indians against the Americans; and in the summer of 1811 hostilities were actually commenced by the tribes north of the Ohio under the lead of Tecumseh, a Shawnee chief of great ability. William Henry Harrison, governor of Indiana territory, encountered them with a considerable force on the banks of the Tippecanoe river, Nov. 7, 1811, and defeated them in one of the most hotly contested battles ever fought between the Indians and the whites. The tribes however were not subdued, and when war was declared in 1812 Gen. Hull, then governor of Michigan, was marching against them at the head of 2,000 men. He was ordered instead to invade Canada from Detroit, which he accordingly did with a force wholly inadequate to the enterprise. He was soon compelled to fall back, and his force being reduced by various casualties to 800 men, he was compelled on Aug. 16 to surrender his army, Detroit, and all Michigan to Gen. Brock. An invasion of Canada on the Niagara frontier was almost equally unsuccessful, and the campaign of 1812 closed with little or no credit to the American arms on land. On the ocean, however, the navy, small as it was, had achieved a series of brilliant victories. The frigate Constitution, Capt. Isaac Hull, captured the British frigate Guerriere, Aug. 19; the sloop of war Wasp, Capt. Jones, captured the brig Frolic, Oct. 18; the frigate United States, Capt. Decatur, captured the frigate Macedonian, Oct. 25; and the Constitution, of which Capt. Bainbridge had now taken command, captured the frigate Java, Dec. 29. In all these contests the British loss in killed and wounded was almost 8 to 1 of that of the Americans, and the result highly elated the public, with whom the navy hitherto had been in no special favor. A vast swarm of privateers scoured the ocean, preying upon British commerce to such an extent that their captures in this year alone amounted to more than 800 vessels. For the campaign of 1818 three armies were raised, viz.: that of the west, at the head of Lake Erie, under Gen. Harrison; that of the centre, between Lakes Erie and Ontario, under Gen. Dearborn; and that of the north, near Lake Champlain, under Gen. Wade Hampton. Their operations were productive of alternate successes and reverses. In January a detachment of 800 from the western army, under Gen. Winchester, was defeated and captured at the river Raisin, and most of the prisoners massacred by the Indian allies of the English. In April Gen. Pike with 1,700 Americans captured York (now Toronto), but was himself killed by the explosion of a mine prepared for the purpose; the British loss was about 700. About the same time Col. Dudley with 800 men was defeated by the Indians under Tecumseh, with heavy loss. In May an attack on Sackett's Harbor by the British under Gen. Prevost was repulsed by Gen. Brown, and Fort George in Canada taken by the Americans under Gen. Boyd and Col. Miller. In this last affair the British lost nearly 1,000 men. In October Gen. Harrison defeated the British near the Thames river in Canada, with severe loss, the Indian chief Tecumseh being among the slain. On the Niagara frontier, where the chief preparations for the invasion of Canada had been made, a disagreement between Gens. Wilkinson and Hampton prevented any efficient action by the American forces. The navy as usual was more successful than the army. On Lake Erie, Sept. 10, a British fleet of 6 vessels was captured after a severe contest by Commodore O. H. Perry, an achievement which rendered the Americans masters of the lake. On the ocean, the Hornet, Capt. Lawrence, captured the Peacock, Feb. 24; and the Enterprise, Lieutenant Burrows, captured the Boxer, Sept. 5. On the other hand, the U. S. frigate Chesapeake, commanded by Capt. Lawrence, was on June 1 captured by the British frigate Shannon, Capt. Broke, an exploit for which the tower guns at London were fired and Capt. Broke was knighted. The campaign of 1814 was conducted with more vigor on both sides, and was marked by obstinate and sanguinary engagements on the Niagara frontier. On July 5 the British were defeated at Chippewa by Gen. Brown, and on the 25th at Bridgewater or Lundy's Lane by Gens. Brown and Winfield Scott, the latter of whom had also distinguished himself at Chippewa. The war in Europe having closed, large reënforcements, consisting of the troops which had served under Wellington in Spain, were sent to Canada by the British government; and Sir George Prevost, at the head of 14,000 men, invaded New York on the northern frontier and laid siege to Plattsburg. His army was supported by a powerful fleet on Lake Champlain, commanded by Commodore Downie. On Sept. 11 the U. S. fleet, commanded by Commodore Macdonough, totally defeated the English fleet, and on the same day Gen. Macomb repulsed the British army, which fled back to Canada with a loss of 2,500 men. In August a British fleet arrived in the Chesapeake with an army of 5,000 men commanded by Gen. Ross, who landed in the Patuxent and marched on Washington, and, after encountering and putting to flight the militia at Bladensburg, took possession of the federal city and burned the capitol, the president's house, and other public buildings. On the day after this barbarous exploit the British retired to their ships, and on Sept. 12–18 made an attack on Baltimore, where they were repulsed by the citizens, and Gen. Ross was killed. On the ocean during this year the

British vessels of war Epervier, Avon, Reindeer, Cyane, Levant, and Penguin were taken by the Americans, who on their part lost the frigates Essex and President, both captured by greatly superior forces of the enemy. The restoration of peace in Europe led both the United States and Great Britain to desire a termination of their contest, which had in fact grown wholly out of disputes originating in the great conflict of arms beyond the Atlantic; and after protracted negotiations a treaty of peace was finally signed at Ghent, Dec. 24, 1814, on the part of the United States, by Henry Clay, John Quincy Adams, Jonathan Russell, James A. Bayard, and Albert Gallatin. The treaty provided for the mutual restoration of all territory taken during the war, and for the mutual appointment of commissioners to determine the northern boundary of the United States. Nothing was said of the impressment of American seamen, one of the main causes of the war, but the practice was discontinued by the British naval commanders. Before the news of peace could cross the Atlantic a British army 12,000 strong, led by Gens. Pakenham, Gibbs, Keene, and Lambert, landed on the coast of Louisiana and made an attack on New Orleans, which was defended by Gen. Andrew Jackson with 5,000 men, chiefly militia from Tennessee and Kentucky. The attack was repelled, Jan. 8, 1815, with a loss to the British of 2,000 killed, wounded, and prisoners, while the entire American loss was but 71. The war from its beginning had been distasteful to the majority of the people of New England, who, being mostly federalists, regarded it not only as unnecessary and impolitic, but as waged chiefly to gratify democratic prejudice against England and partiality for France. They suffered from it immense losses by the destruction of their commerce and their fisheries, and the federal government did little or nothing for their protection from the enemy. It was to remedy these evils that the celebrated Hartford convention was held (see HARTFORD CONVENTION), which resulted in nothing but a report to the legislatures which it represented, urging certain amendments to the constitution and a definition of the power of the federal government over state troops. This last point was almost immediately settled by congress in a satisfactory manner, and the news of the treaty of Ghent put an effective stop to the discussions raised by the convention. For many years, however, the democrats continued to impute treasonable designs to the Hartford convention, and it was one of the causes which led to the decay and extinction of the federal party. During the war the Algerines had resumed their old practice of piracy, had seized several American vessels, and had insulted and plundered the American consul. Immediately after the conclusion of peace with Great Britain, a naval force commanded by Decatur and Bainbridge was sent to the Mediterranean, which captured several Algerine cruisers, and in a few weeks compelled the rulers of Algiers, Tunis, and Tripoli to make indemnity for their outrages, and to agree to abstain from further depredations on American commerce. The national finances were in a very confused state at the close of the war, the debt created by which exceeded $80,000,000. The banks, except in New England, had suspended specie payments, and the want of a uniform and solvent currency was urgently felt. To remedy this latter evil, congress in the session of 1816–'17 chartered for 20 years a national bank at Philadelphia, with a capital of $35,000,000, whose notes furnished a convenient and uniform circulating medium, convertible at all times into gold and silver.—The presidential election of 1812 had resulted in the choice of Mr. Madison for a second term by a vote of 128, against 89 for De Witt Clinton, who was supported by the federalists. At the same time Elbridge Gerry was chosen vice-president in opposition to Jared Ingersoll. On the approach of the presidential election of 1816 it was understood that Mr. Madison would not be a candidate for reëlection, and a caucus of the democratic members of congress was held to nominate a successor. A portion of the party opposed to the predominance of Virginia in the government, that state having given presidents to the country for 6 out of 7 of the presidential terms since the adoption of the constitution, supported William H. Crawford of Georgia in the caucus; but James Monroe of Virginia, Mr. Madison's secretary of state, received the nomination, and in the election was chosen by 183 votes, against 34 votes given to Rufus King by the federal states of Massachusetts, Connecticut, and Delaware. Daniel D. Tompkins of New York was elected vice-president. The administration of Mr. Madison terminated March 4, 1817. The war with Great Britain was its principal feature, but among other events of importance were the admission of Louisiana into the Union in 1812, and of Indiana in 1816, and the establishment of the American colonization society in 1817. President Monroe's cabinet was constituted as follows: J. Q. Adams, secretary of state; William H. Crawford, of the treasury; John C. Calhoun, of war; Benjamin W. Crowninshield, of the navy; and William Wirt, attorney-general. His administration commenced under very favorable circumstances. Party distinctions had so nearly disappeared, that democrats and federalists combined to support the government; and during an extensive tour which the president made through the eastern and middle states soon after his inauguration, he was everywhere favorably received by the people, among whom his appearance and demeanor rendered him popular; and finally on the expiration of his term he was reëlected in 1820 by all the electoral votes except one. The main event of his administration was the Missouri controversy, by which for the first time the country was divided upon the slavery question, and the states of the North, in which slavery, never very deeply rooted, was extinct or in process of extinction, were arrayed against the states of the South. The admissions to the Union hitherto had been of a slaveholding and non-slaveholding state alternately. Vermont and Kentucky, Tennessee and Ohio, Louisiana and Indiana had mutually offset each other; and in 1817 the slaveholding state of Mississippi was admitted, followed immediately in 1818 by non-slaveholding Illinois. Congress in its session of 1818–'19 authorized the territory of Alabama, which was rapidly filling with a slaveholding population, to form a constitution without any prohibition of slavery. A similar bill was brought forward for the territory of Missouri, and James Tallmadge of New York moved in the house of representatives to insert a clause prohibiting any further introduction of slaves, and granting freedom to the children of those already there on their attaining the age of 25; and this motion was carried, 87 to 76. A few days later John W. Taylor of New York moved as an amendment to a bill for the organization of Arkansas, that slavery should not hereafter be introduced into any part of the territories of the United States N. of lat. 36° 30′. This was intended as a compromise, but was warmly opposed, a large number both of northern and southern members declaring themselves hostile to any compromise whatever, and the amendment was consequently withdrawn by Mr. Taylor. The slaveholders contended that for congress to prohibit slavery in the territories would be a violation of the constitutional right of the citizen to enjoy his property anywhere within the jurisdiction of the United States. The restrictionists, on the other hand, denied that men could be property under the jurisdiction of the United States, however the case might be under the laws of particular states; and they maintained that the constitutional question was conclusively settled by the action of the congress contemporaneous with the framing of the federal constitution, which in 1787 introduced into the bill for the government of the territory N. W. of the Ohio the proviso that "there shall be neither slavery nor involuntary servitude in said territory, otherwise than in punishment for crime." And in further confirmation of their views, they brought forward the fact that the most distinguished statesman of the South, Thomas Jefferson, had in 1784 introduced and urged with all his influence the passing of a bill in congress prohibiting slavery, not only in all the territory held by the United States, but in all that might be afterward acquired. The debate on this subject was long and excited. The southern orators declared that if the restriction should be persisted in the South would retire and the Union be dissolved. Mr. Cobb of Georgia, looking significantly at Mr. Tallmadge, exclaimed that "a fire had been kindled which all the waters of the ocean could not put out, and which only seas of blood could extinguish." Mr. Tallmadge replied with equal warmth: "If a dissolution of the Union must take place, let it be so! If civil war, which gentlemen so much threaten, must come, I can only say, let it come! My hold on life is probably as frail as that of any man who now hears me; but while that hold lasts, it shall be devoted to the freedom of man. If blood is necessary to extinguish any fire which I have assisted to kindle, while I regret the necessity, I shall not hesitate to contribute my own." The senate refused to concur in the restriction imposed by the house, and consequently the Missouri bill failed for the session of 1818–'19. During the recess of congress a strong public agitation against slavery arose in the middle states, and finally spread to New England, both democrats and federalists coöperating in it. An accidental advantage in the controversy, however, was furnished to the South by the erection of Maine into a state with the consent of Massachusetts, thus adding another to the list of free states, and forming a counterpoise to Alabama, which was admitted into the Union early in the session of 1819–'20, an event promptly followed by the admission of Maine. When the legislatures of the free states met in their annual session in 1820, the agitation among the people on the slavery question was forcibly expressed by their representatives. Pennsylvania led off by a solemn appeal to the states "to refuse to covenant with crime," and by a unanimous declaration that it was the right and the duty of congress to prohibit slavery in the territories. The rest of the middle states also unanimously adopted similar resolutions. Ohio and Indiana took the same position; and though the New England legislatures were silent, numerous memorials from towns, cities, and public meetings in favor of freedom were laid before congress. The legislatures of the slave states expressed themselves, on the other hand, very strongly in opposition to restriction. In congress the debate was long and acrimonious. The senate sent to the house the Missouri bill with the prohibition of slavery in that state struck out, but with the proviso that it should not hereafter be tolerated N. of lat. 36° 30′. The striking out of the restrictive clause was reluctantly assented to by the house by a vote of 90 to 87, a very few northern members voting for it. The compromise by which slavery was prohibited for ever N. of 36° 30′ was then agreed to by a vote of 134 to 42. The northern states acquiesced in this compromise as a political necessity, and as finally settling a controversy dangerous to the peace and stability of the Union, and the slavery agitation subsided for a time. The other great question of Mr. Monroe's administration was the recognition of the Spanish American republics, which had declared and maintained their independence for several years. Chiefly by the efforts and the eloquence of Henry Clay, their independence was acknowledged in 1822; and in the following year the president in his annual message declared that "as a principle the American continents, by the free and independent position which they have assumed and maintained, are henceforth not to be considered as subjects for future colonization by any European power;" a declaration which has since been famous as the "Monroe doctrine."—Mr. Monroe declined being a candidate for a third term, and in the presidential election of 1824 the confused state of parties led to the nomination of four candidates, none of whom had a majority of the electoral votes. Andrew Jackson received 99, John Quincy Adams 84, William H. Crawford 41, and Henry Clay 87. The election went to the house of representatives, where Mr. Adams received the vote of 18 states, and was declared president. John C. Calhoun had been elected vice-president by the electoral colleges. The political views of Mr. Adams did not differ from those of Mr. Monroe, and his foreign and domestic policy was very similar. He appointed Henry Clay secretary of state; Richard Rush, of the treasury; James Barbour, of war; Samuel L. Southard, of the navy; and William Wirt, attorney-general. His administration was remarkable for order, method, and economy, though party spirit, springing from quarrels generated by the election, was higher and more rancorous than it had been for many years. Perhaps the most important event in his term was the adoption of what was called the American system of protecting home manufactures by a heavy duty upon foreign articles of the same kind, a system popular in the manufacturing North, but bitterly opposed in portions of the agricultural South. A tariff law enacted in 1828 on the principle of protection, led a few years later to political complications of a most serious character. The presidential contest of the same year was carried on with great animation and virulence, chiefly by means of discussions on the personal character and history of the candidates, Gen. Jackson having been nominated in opposition to Mr. Adams. The result was the election of Jackson by 178 votes to 88 for Adams, while John C. Calhoun was reëlected vice-president in opposition to Richard Rush, who was supported by the friends of Mr. Adams. President Jackson selected for his cabinet Martin Van Buren, secretary of state; Samuel D. Ingham, of the treasury; John H. Eaton, of war; John Branch, of the navy; John McPherson Berrien, attorney-general; and William T. Barry, postmaster-general. The last named officer was now for the first time made a member of the cabinet. In his first annual message, Dec. 1829, the president took strong ground against the renewal of the charter of the United States bank, as an institution not authorized by the constitution. A long and excited contest ensued in congress and among the people on this question, between the friends of the bank and the partisans of the president. Congress in 1832 passed a bill to recharter the bank, but Jackson vetoed it; and as it failed to receive the votes of two thirds of the members of both houses, the bank charter expired by limitation in 1886. The commercial part of the community in this contest generally took the side of the bank, and the party formed in opposition to the president assumed the name of whig, while his supporters adhered to the old name of democracy. The tariff of 1828 had always been distasteful to the cotton-growing states, and on the passing of an act of congress in the spring of 1882 imposing additional duties upon foreign goods, the discontent of South Carolina broke out in almost actual rebellion. A state convention held there in November declared the tariff acts unconstitutional and therefore null and void, and proclaimed that any attempt by the general government to collect duties in the port of Charleston would be resisted by force of arms, and would produce the secession of South Carolina from the Union. The chief leaders of the nullifiers, as this South Carolina party was called, from their assertion of the right of a state to nullify an act of congress which she deemed unconstitutional, were John C. Calhoun, who had recently resigned the vice-presidency and become a senator of the United States; Robert Y. Hayne, also a senator; and George McDuffie, governor of the state. To support their position they made considerable military preparations, and for a time civil war between South Carolina and the federal government seemed inevitable. In this crisis Jackson (who had just been reëlected for a second term by 219 electoral votes, against a divided opposition which cast 49 votes for Henry Clay, 11 for John Floyd, and 7 for William Wirt, Mr. Van Buren being at the same time chosen vice-president) acted with the promptness and energy which always marked his career. All the disposable army was ordered to assemble at Charleston under Gen. Scott, and a ship of war was sent to that port to insure the collection of duties. A proclamation was issued, Dec. 10, 1882, denying the right of a state to nullify any act of the federal government, and warning all engaged in fomenting the rebellion that the laws against treason would be enforced at all hazards and to their utmost penalties. The leaders of the nullifiers were also privately given to understand that if they committed any overt act they should surely be hanged. The firmness of the president, who in this conjuncture was warmly supported by the great mass of the nation of all parties, gave an effectual check to the incipient rebellion, and the affair was finally settled by a proposition brought forward in congress by Henry Clay, the leading champion of the protective system, for the modification of the tariff by a gradual reduction of the obnoxious duties—a compromise which was accepted by the nullifiers as the only means of escape from the perilous position in which they had placed themselves. Meanwhile a personal quarrel had led to changes in the cabinet, which in the latter part of 1881 was constituted thus: Edward Livingston, secretary of state; Louis McLane, of the treasury; Lewis Cass, of war; Levi Woodbury, of the navy; and Roger B. Taney, attorney-general. In his annual message in Dec. 1832, the president recommended the removal of the public funds from the bank of the United States, where they were by law deposited. Congress by a decisive vote refused to authorize the removal, and the president on his own responsibility directed the secretary of the treasury to withdraw the deposits and place them in certain state banks. Mr. McLane declined to do so without better reasons than were apparent, and was transferred to the state department, which had become vacant by the appointment of Mr. Livingston as minister to France. William J. Duane, who succeeded Mr. McLane in the treasury department, was as unmanageable as his predecessor, and was finally removed, and Roger B. Taney, the attorney-general, appointed in his place, Benjamin F. Butler succeeding to the attorney-generalship. Mr. Taney at once removed the deposits to the local banks selected as agents of the government. This and other steps indicating a settled hostility to the bank were attended by a financial panic, and great commercial distress immediately ensued. Intense excitement prevailed throughout the country, and considerable numbers who had hitherto supported Jackson in all his measures went over to his opponents. The opposition in the senate, headed by Clay, Webster, and Calhoun, denounced him with great power and severity, and a resolution censuring his policy was adopted by a vote of 26 to 20. This was expunged from the journal, March 28, 1837, on motion of Mr. Benton, by a vote of 24 to 19. The house of representatives, however, sustained the president. The foreign diplomacy of President Jackson was very successful. Useful commercial treaties were made with several countries, and indemnities for spoliations on American commerce were obtained from France, Spain, Naples, and Portugal. At home the principal events of his administration, beside those already mentioned, were the extinction of the national debt, the beginning of the war with the Seminole Indians in Florida, and the admission of Michigan and Arkansas into the Union in 1836. At the end of his second term, March 4, 1837, Jackson retired from public life with a reputation, which, at first confined to his own party, has gradually become universal, inferior to that of no American president for energy, patriotism, and practical sagacity.—In the presidential contest of 1836 Mr. Van Buren was supported by the democrats, while the opposition or whig vote was divided between William Henry Harrison, Judge White, Daniel Webster, and Willie P. Mangum, the greater part of it being given to Gen. Harrison. The result was the election of Mr. Van Buren by 170 electoral votes, against 124 for all the other candidates. Richard M. Johnson was elected vice-president by the senate, in opposition to Francis Granger, John Tyler, and William Smith. President Van Buren selected as his cabinet, John Forsyth, secretary of state; Levi Woodbury, of the treasury; Joel R. Poinsett, of war; Mahlon Dickerson, of the navy; B. F. Butler, attorney-general; and Amos Kendall, postmaster-general; all of whom except Mr. Poinsett had been members of President Jackson's cabinet at the close of his last term. The new administration commenced under most untoward circumstances, the business of the country, affected by excessive speculation and overtrading, and by sudden contractions and expansions of the currency, being on the verge of almost utter ruin. Within two months after the inauguration of the president the mercantile failures in the city of New York alone amounted to more than $100,000,000. Nearly the whole of Mr. Van Buren's term was occupied by attempts to remedy these evils by legislative measures for the establishment of a stable currency, and a sound system of government finance. A favorite measure of the president was the independent treasury system for the custody of the public funds, which ultimately was sanctioned by congress, and is still in force. The war with the Seminoles was continued through the whole of Mr. Van Buren's term, and in fact was not ended till 1842, after it had cost the United States nearly $40,000,000. In June, 1838, Mr. Dickerson resigned the secretaryship of the navy, and James K. Paulding was appointed in his place. In the same year B. F. Butler resigned as attorney-general, and Felix Grundy was appointed, who in the following year was succeeded by Henry D. Gilpin. John M. Niles succeeded Amos Kendall as postmaster-general in May, 1840. The pecuniary troubles of the country were imputed in great measure to the financial policy of the administration by its political opponents; and as the presidential election of 1840 approached, the state elections indicated that Mr. Van Buren had not inherited all the popularity of his immediate predecessor, and that the power of the democratic party was in imminent danger of at least a temporary overthrow. A whig national convention (the congressional caucus system for nominating candidates having been abandoned) was held at Harrisburg, Dec. 4, 1839, and after several ballotings Gen. Harrison was nominated as a candidate for president, with John Tyler for vice-president. The national democratic convention met at Baltimore, May 5, 1840, and unanimously nominated Mr. Van Buren. The canvass was one of the most animated and exciting that has ever taken place, and the result was that Harrison and Tyler each received 234 electoral votes, and Van Buren 60, while the same number were divided between R. M. Johnson, L. W. Tazewell, and James K. Polk as democratic candidates for the vice-presidency.—Gen. Harrison was inaugurated March 4, 1841, and selected as his cabinet Daniel Webster, secretary of state; Thomas Ewing, of the treasury; John Bell, of war; George E. Badger, of the navy;

Francis Granger, postmaster-general; and J. J. Crittenden, attorney-general. Before, however, any distinctive line of policy could be adopted by the new administration, the president died, April 4, just one month after his inauguration. The presidential office devolved on John Tyler, who retained the cabinet of his predecessor until the following September, when all but the secretary of state resigned in consequence of the unexpected development of a policy on the part of the president in relation to a national bank much more in accordance with the views of the democratic party, to which he had formerly been attached, than to those of the whigs, by whom he had been elevated to power. He repeatedly vetoed acts of congress chartering a national bank or fiscal agent, and was consequently vehemently denounced by the whigs as having betrayed the trust they had put in him. The places of the retiring members of the cabinet were filled by Walter Forward, appointed secretary of the treasury; John C. Spencer, of war; Abel P. Upshur, of the navy; Charles A. Wickliffe, postmaster-general; and Hugh S. Legaré, attorney-general. Mr. Webster continued to hold the office of secretary of state for the purpose of conducting negotiations with Great Britain on the subject of the north-western boundary, which was finally settled by a treaty concluded between him and Lord Ashburton, and ratified by the senate Aug. 20, 1842. In May, 1843, Mr. Webster resigned, and Mr. Legaré, the attorney-general, was made acting secretary of state, but died in the following June. Mr. Upshur was then transferred from the navy department to that of state, and Mr. Thomas W. Gilmer was made secretary of the navy; but both those gentlemen were killed, Feb. 28, 1844, by the bursting of a gun on board the U. S. war steamer Princeton, and John C. Calhoun was made secretary of state, and John Y. Mason of the navy. On April 12, 1844, a treaty to annex Texas to the United States was concluded by Mr. Calhoun and the agents of the new republic, but was rejected by the senate, on the ground that it would involve the country in a war with Mexico. The Texas question, however, immediately became the prominent issue in the presidential contest of that year, the democratic party supporting and the whigs opposing annexation. At the South it was advocated as a means of strengthening the slavery interest, and at the North it was in great part opposed for the same reason, the anti-slavery element in both the parties being at this period of considerable strength. The friends of Texas soon obtained control of the democratic party, and at the national convention of that party at Baltimore, May 27, 1844, Mr. Van Buren, who had expressed himself unconditionally opposed to annexation, was rejected as a candidate for the presidency, and James K. Polk, formerly governor of Tennessee and speaker of the U. S. house of representatives, was nominated, with George M. Dallas as candidate for vice-president. The whig national convention, which met at Baltimore, May 1, had already nominated for president Henry Clay, and for vice-president Theodore Frelinghuysen. The result of the election was 170 electoral votes for Polk and Dallas, and 105 for the whig candidates. The management of the Texas question was now assumed by congress, and joint resolutions for annexing that country to the United States as one of the states of the Union passed the house of representatives Jan. 25, 1845, by a vote of 120 to 98, and the senate March 1, by a vote of 27 to 25. They were immediately signed by President Tyler, whose last important official act was to sign two days later the bill admitting Florida and Iowa into the Union.—President Polk appointed as his cabinet James Buchanan, secretary of state; Robert J. Walker, of the treasury; William L. Marcy, of war; George Bancroft, of the navy; Cave Johnson, postmaster-general; and John Y. Mason, attorney-general. At the beginning of his administration the president found the country involved in disputes with Mexico, growing out of the annexation of Texas to the United States. Gen. Zachary Taylor was sent with a small army to occupy the region between the Nueces and the Rio Grande, which the United States claimed as belonging to Texas, while the Mexicans maintained that Texas had never extended beyond the Nueces. In April, 1846, a slight collision occurred on the Rio Grande between Gen. Taylor's army and that of the Mexican commander, Gen. Arista. When the news reached Washington, the president, on May 11, sent a special message to congress declaring that "war existed by the act of Mexico," and asking for men and money to carry it on. Congress, by a vote of 142 to 14 in the house, and of 40 to 2 in the senate, promptly appropriated $10,000,000, and gave authority to call out 50,000 volunteers. Taylor meanwhile had defeated the Mexicans at Palo Alto, May 8, and at Resaca de la Palma, May 9, and subsequently on being reënforced continued the war by brilliant victories at Monterey in September, and at Buena Vista, Feb. 22, 1847. (See TAYLOR, ZACHARY.) The conduct of the war, which had so far been intrusted to Gen. Taylor, was now assumed by Gen. Scott, commanding in chief. The American forces, naval and military, were concentrated in the gulf of Mexico, and on March 9, 1847, Scott landed near Vera Cruz with about 12,000 men. That city was immediately besieged, and surrendered March 29. Gen. Scott soon began his march toward the city of Mexico, which he entered triumphantly Sept. 14, after a series of hard-fought and uniformly successful battles. (See SCOTT, WINFIELD.) Meanwhile Gen. Stephen W. Kearny, at the head of a small force, had marched from Fort Leavenworth over the great plains to Santa Fé, and conquered New Mexico in Aug. 1846. He instituted an American government over the province, and then resumed his march toward California, which however had already been conquered by Col. Fremont and Commodore Stockton. On his arrival at Monterey, Gen. Kearny assumed the office of governor, and on Feb. 8, 1847, proclaimed the annexation of California to the United States. While Kearny was on his way to California, Col. Doniphan, at the head of 1,000 Missouri volunteers, had performed a prodigious march across the plains, and taken the city of Chihuahua, after routing, Feb. 28, 4,000 Mexicans, who met him about 18 miles from the city. Gen. Scott's army occupied the Mexican capital until after the ratification of a treaty of peace which was negotiated at Guadalupe Hidalgo, Feb. 2, 1848, by Nicholas P. Trist on the part of the United States. By this treaty Mexico granted to the United States the line of the Rio Grande as a boundary, and also ceded New Mexico and California. On their part the United States agreed to pay Mexico $15,000,000, and to assume the debts due by Mexico to American citizens to an extent not exceeding $3,750,000. At the beginning of the Mexican war negotiations were going on between Great Britain and the United States in relation to Oregon, which the latter had long considered as one of their territories. "The whole of Oregon up to 54° 40′" had been one of the watchwords of the democratic party during the recent presidential canvass, and Mr. Polk in his inaugural address had declared that "our title to the country of the Oregon was clear and unquestionable." Great Britain, however, on various pretexts, asserted a claim to the whole country, and the president after much negotiation finally offered as an amicable compromise the boundary of the parallel of 49°, with a modification which gave to her the whole of Vancouver island, which was agreed to by Great Britain. The other important measures of Mr. Polk's administration were the modification of the tariff in 1846, by which its protective features were lessened, and the admission of Wisconsin into the Union as the 30th state, May 29, 1848.—Mr. Polk, in accepting the democratic nomination in 1844, had pledged himself not to be a candidate for reëlection; and in the democratic national convention which met at Baltimore in May, 1848, Lewis Cass was nominated for president, and William O. Butler for vice-president. By the whig convention, which met at Philadelphia on June 1, Zachary Taylor and Millard Fillmore were nominated for the same offices. The question of slavery had a powerful influence on the political combinations of this period. After the subsidence of the Missouri agitation in 1821, slavery attracted little attention until the establishment of the "Liberator" newspaper by William Lloyd Garrison at Boston, Jan. 1, 1831, and the formation of anti-slavery societies in the free states in 1832–'3 by Arthur Tappan and others. These societies relied exclusively on moral and religious influences to promote emancipation, and avoided political action, affirming that congress had no right to interfere with slavery in the states, though they petitioned that body to abolish the institution in the territories, in the District of Columbia, and wherever else the federal government had constitutional jurisdiction. They declared that their principles led them "to reject, and to entreat the oppressed to reject, the use of all carnal weapons for deliverance from bondage." Their lecturers, newspapers, public meetings, and petitions to congress rapidly made converts, and created great excitement throughout the country. Violent attempts were made in 1834 and subsequent years, by the opponents of emancipation, to suppress this agitation; and serious riots, attended in some instances by loss of life and destruction of property, took place in New York, Boston, Philadelphia, Cincinnati, Alton, and other northern cities. In the South the legislatures of Virginia, North and South Carolina, Georgia, Alabama, and some other states passed resolutions calling upon the northern states to suppress the agitation by penal enactments prohibiting the printing of anti-slavery publications. President Jackson, in his annual message of Dec. 1835, recommended to congress to pass a law prohibiting the circulation through the mail of anti-slavery publications; and a bill framed in accordance with this suggestion reached a third reading in the senate in 1836, but was finally rejected. In the house a rule was adopted in the same year, "that all petitions, memorials, resolutions, and propositions relating in any way or to any extent whatever to the subject of slavery, shall, without being either printed or referred, be laid on the table, and no further action whatever shall be had thereon." This rule, which was repeatedly rescinded and reënacted, led to long and excited debates on the right of petition, in which ex-president John Quincy Adams, then a representative from Massachusetts, was conspicuous in defence of that right; and the rule was finally rescinded in Dec. 1845. In 1840 a disagreement among the abolitionists led to their separation into two divisions, one of which, under the lead of Mr. Garrison, in 1844 took the position that the compromises of the constitution on the subject of slavery were immoral, and that consequently it was sinful to swear to support that instrument or to hold office or vote under it, and that the union of the states was "an agreement with hell and a covenant with death," which ought to be at once dissolved. This body, though conspicuous by the zeal, energy, and eloquence of Mr. Garrison, Mr. Wendell Phillips, and a few others of its leaders, has had—from the scantiness of its numbers, amounting to only a few hundreds, its abstinence from political action, and the unpopularity of its opinions, not only respecting the Union and the constitution, but upon woman's rights, the condition of the churches, and other questions—little or no direct influence on public affairs. The other and far more numerous division of the abolitionists, with whom the followers of Mr. Garrison were often erroneously confounded, adhered to the Union and the constitution, and, having become satisfied that both the whig and democratic parties were completely under the control of the slaveholders, established in 1840 the "liberty party," and at a national convention held at Albany nominated James G. Birney for president and Thomas Earle for vice-president. Their entire vote at the election of that year was 7,609. At the next presidential election in 1844 Mr. Birney was again nominated for president, with Thomas Morris for vice-president, and received 62,300 votes. These figures, however, imperfectly represented the numbers of the opponents of slavery, most of whom still maintained their connection with the two great parties, on whose action they had so powerful an influence, that while the Texas question was still pending 14 northern states protested, through their legislatures, in some cases by unanimous vote of all parties, against any enlargement of the area of slavery; and in 1846, during the Mexican war, a bill being before congress authorizing the president to use the sum of $2,000,000 in negotiating a peace, Mr. David Wilmot, a democratic representative from Pennsylvania, moved to add thereto the proviso, "That there shall be neither slavery nor involuntary servitude in any territory on the continent of America, which shall hereafter be acquired by or annexed to the United States by virtue of this appropriation, or in any other manner whatsoever, except for crime of which the party shall have been duly convicted." This proviso was adopted in the house by a large majority, nearly all the members from the free states voting for it, but failed in the senate from want of time. At the next session, 1846-'7, a similar bill appropriating $3,000,000 had the Wilmot proviso affixed to it by a vote of 115 to 106; but it was rejected by the senate by a vote of 31 to 21, and the bill being sent back to the house the proviso was abandoned by a vote of 102 to 97. On the termination of the war, the practical question involved in the Wilmot proviso, whether the introduction of slavery should be allowed or prohibited in the territories newly acquired from Mexico, became of prominent interest. In the whig national convention, held at Philadelphia in 1846, by which Gen. Taylor was nominated, there were several delegates from the northern states representing what were called "free soil" opinions, that is, opinions hostile to the extension of slavery, by whom after the nomination of candidates the following resolution was offered as an amendment to the platform of principles adopted by the convention: "Resolved, that while all power is denied to congress under the constitution to control or in any way interfere with the institution of slavery within the several states of the Union, it nevertheless has the power, and it is the duty of congress, to prohibit the introduction or existence of slavery in any territory now possessed, or which may hereafter be acquired, by the United States." This was rejected, and several of the free soil delegates consequently withdrew from the convention, and subsequently separated themselves from the whig party. A similar schism had already taken place in the democratic national convention of the same year, the "barnburners," as the free soil democrats were termed, having seceded partly on anti-slavery and partly on personal grounds. An agreement was soon made between these seceding whigs and democrats and the liberty party to unite their forces in opposition to the extension of slavery; and a convention was accordingly held at Buffalo, Aug. 9, 1848, which was attended by delegates from all the free states and from Delaware, Maryland, Virginia, and the District of Columbia. A free soil or free democratic party was formed, and Martin Van Buren was nominated for president and Charles Francis Adams for vice-president. A platform was adopted, declaring that the new party was formed "to maintain the rights of free labor against the aggressions of the slave power, and to secure free soil to a free people; that slavery, in the several states of this Union which recognize its existence, depends upon the state laws alone, which cannot be repealed or modified by the general government, and for which laws that government is not responsible; we therefore propose no interference by congress with slavery within the limits of any state; that the only safe means of preventing an extension of slavery into territory now free is to prohibit its extension in all such territory by an act of congress; that we accept the issue which the slave power has forced upon us, and to their demand for more slave states and more slave territory, our calm but final answer is, no more slave states and no more slave territory." Van Buren and Adams received at the presidental election, in Nov. 1848, a popular vote of 291,263, but secured no electoral vote. The democratic candidates, Cass and Butler, received 127 electoral votes; and the whig candidates, Taylor and Fillmore, received 163 electoral votes, and were consequently elected.—President Taylor was inaugurated on Monday, March 5, 1849, and appointed as his cabinet John M. Clayton, secretary of state; William M. Meredith, of the treasury; George W. Crawford, of war; William B. Preston, of the navy; Thomas Ewing, of the interior (an office created by congress two days before, March 3, 1849); Jacob Collamer, postmaster-general; and Reverdy Johnson, attorney-general. One of the earliest and most difficult of the questions which pressed on the new administration arose out of the acquisition of California and New Mexico. In Feb. 1848, gold began to be found in California in large quantities, and the news of its discovery created such an excitement in the United States that in a short time thousands of emigrants were on their way thither by land and water, and their numbers were soon sufficient to constitute a state. They held a convention at Monterey, and on Sept. 1, 1849, adopted a constitution with a clause prohibiting slavery. When congress assembled in December, the question of slavery gave rise to excited debates, in which several of the southern members threatened secession and civil war in case the institution was excluded from the newly acquired territories. Much agitation existed throughout the country, especially in the states on the gulf of Mexico, where the disunion party possessed considerable popular strength. An address to the people of the South, signed by most of the southern members of congress, was published, which was far from conciliatory in its tone; the legislatures of South Carolina and Mississippi issued a call for a southern congress to frame a government for a "United States South;" and a disunion convention of delegates from the southern states actually assembled at Nashville. In the North the agitation was directed not against the Union, but for its preservation, and great meetings were held in all the principal cities to protest against any further interference with slavery. President Taylor, in a message to congress, Jan. 21, 1850, stated that he had himself advised the people of California to form a constitution, and he urged congress to receive and favorably consider their application for admission into the Union. This, however, continued to be opposed by the South, and a parliamentary struggle ensued, the most violent and protracted in American history. The extreme slavery party, led by Mr. Calhoun, demanded not only the rejection of California, but, among other concessions, an amendment of the constitution that should equalize the political power of the free and slave states. The question was still further complicated by the application of New Mexico for admission, and by a claim brought forward by Texas to a western line of boundary which would include a large portion of New Mexico. Finally a compromise was proposed by Henry Clay in the senate as a final settlement of the whole question of slavery, and after a long discussion the result aimed at by Mr. Clay was attained by separate acts, which provided for: 1, the admission of California as a free state; 2, territorial governments for New Mexico and Utah without excluding slavery, but leaving its exclusion or admission to the local population; 3, the settlement of the Texas boundary question; 4, the abolition of the slave trade in the District of Columbia; 5, the enactment of a stringent law for the arrest and return of fugitive slaves. Ten of the southern senators, including Messrs. Mason and Hunter of Virginia, Soulé of Louisiana, and Jefferson Davis of Mississippi, published a final protest against the admission of California after the vote was taken; and the free soil party at the North denounced the concessions to Texas and the refusal to prohibit slavery in New Mexico and Utah as unjust and unwise, and proclaimed the fugitive slave law as immoral and cruel, and unconstitutional on the ground that the constitution gives congress no power to legislate on the subject, but leaves the rendition of fugitives from justice and labor to the individual states. Nevertheless the great body of the people North and South acquiesced in the compromise as a final settlement of a dangerous question; and the fugitive slave law, though resisted in a few instances by mobs, was practically enforced by the authorities in all the free states where fugitives were arrested. While the compromise bills were yet before congress, President Taylor died after a few days' illness, July 9, 1850, and was succeeded by the vice-president, Millard Fillmore, who on July 15 reconstructed the cabinet as follows: Daniel Webster, secretary of state; Thomas Corwin, of the treasury; Charles M. Conrad, of war; Alexander H. H. Stuart, of the interior; William A. Graham, of the navy; Nathan K. Hall, postmaster-general; and John J. Crittenden, attorney-general. The compromise bills were signed by Mr. Fillmore Sept. 9, and the whole weight of his administration was given to their support, and especially to the enforcement of the fugitive slave law. During the remainder of his term the events of most importance were the invasion of Cuba, in Aug. 1851, by a band of "fillibusters" from New Orleans, led by Gen. Lopez, who was speedily defeated, captured, and executed with many of his followers; the visit of Louis Kossuth to the United States in Dec. 1851; a dispute with England on the subject of the fisheries in 1852, which was settled by mutual concessions; and lastly the negotiation of a treaty with Japan by Commodore Perry, in command of an American fleet, by which the commerce of that empire was thrown open to the world.—On the approach of the presidential election of 1852 it became evident that, notwithstanding the apparent acquiescence of the great mass of the people in the compromise measures of 1850, the question of slavery was still a source of political agitation. The democrats of the South were divided into "Union men" and "southern rights men," the latter maintaining the right of a state to secede from the Union whenever its rights were violated by the general government. On the other hand, the whigs of the South were mostly Union men and satisfied with the compromise measures, while a majority of the whigs of the North were opposed to the fugitive slave law, though not offering resistance to its execution, and were still desirous of preventing the extension of slavery by national legislation. The democratic national convention met at Baltimore, June 1, 1852, and, after balloting for 4 days, on the 49th ballot nominated for president Gen. Franklin Pierce of New Hampshire, who had commanded a brigade in the Mexican war, and was known to hold opinions satisfactory to the South on the subject of slavery. Lewis Cass and James Buchanan were the leading candidates in the previous ballotings; and William L. Marcy and Stephen A. Douglas also received considerable support.

William R. King of Alabama was nominated for vice-president. A platform was adopted by the convention declaring resistance to "all attempts at renewing in congress or out of it the agitation of the slavery question, under whatever shape or color the attempt may be made;" and also a determination to "abide by and adhere to a faithful execution of the acts known as the compromise measures settled by the last congress, the act reclaiming fugitives from service or labor included." The whig national convention met at Baltimore, June 16, and on the 53d ballot nominated for president Gen. Winfield Scott. The other candidates for the nomination were Millard Fillmore and Daniel Webster, the former receiving the votes of most of the southern delegates nearly to the close, while Scott and Webster were chiefly supported by the northern delegates. William R. Graham was nominated for vice-president. The platform adopted by the convention declared that "the series of acts of the 32d congress, the act known as the fugitive slave law included, are received and acquiesced in by the whig party of the United States as a settlement in principle and substance of the dangerous and exciting questions which they embrace; . . . . and we deprecate all further agitation of the question thus settled, as dangerous to our peace, and will discountenance all efforts to continue or renew such agitation, whenever, wherever, or however the attempt may be made." Mr. Webster and his especial friends did not cordially acquiesce in the nomination of Gen. Scott, and attempts were made in various places to bring Mr. Webster forward as an independent candidate for the presidency, chiefly by whigs who considered Gen. Scott and his intimate political friends as lukewarm in their support of the compromises; but the death of Mr. Webster, Oct. 24, 1852, before the election, rendered these demonstrations useless. The national convention of the free soil party was held at Pittsburg, Aug. 11, all the free states being represented, together with Delaware, Maryland, Virginia, and Kentucky. John P. Hale was nominated for president and George W. Julian for vice-president. A platform was adopted declaring "that the acts of congress known as the compromise measures of 1850, by making the admission of a sovereign state contingent upon the adoption of other measures demanded by the special interest of slavery; by their omission to guarantee freedom in the free territories; by their attempt to impose unconstitutional limitations on the power of congress and the people to admit new states; and by their invasion of the sovereignty of the states and the liberties of the people through the enactment of an unjust, oppressive, and unconstitutional fugitive slave law, are proved to be inconsistent with all the principles and maxims of democracy, and wholly inadequate to the settlement of the questions of which they are claimed to be an adjustment. That no permanent settlement of the slavery question can be looked for except in the practical recognition of the truth that slavery is sectional and freedom national; by the total separation of the general government from slavery, and the exercise of its legitimate and constitutional influence on the side of freedom; and by leaving to the states the whole subject of slavery and the extradition of fugitives from justice." At the election, Nov. 5, 1852, the democratic candidates, Pierce and King, received the votes of 27 states, casting 254 electoral votes. Scott and Graham received the votes of Vermont, Massachusetts, Kentucky, and Tennessee, with 42 electoral votes. The popular vote for Pierce and King was 1,587,256, for Scott and Graham 1,384,577, and for Hale and Julian 157,296. President Pierce was inaugurated March 4, 1853, and appointed as his cabinet William L. Marcy, secretary of state; James Guthrie, of the treasury; Jefferson Davis, of war; James C. Dobbin, of the navy; Robert McClelland, of the interior; James Campbell, postmaster-general; and Caleb Cushing, attorney-general. Mr. Buchanan was sent as minister to England and Mr. Soulé to Spain. One of the first questions that occupied the administration was a boundary dispute with Mexico concerning a tract of land between New Mexico and Chihuahua, which finally by negotiation and purchase became a part of the United States under the name of Arizona. In 1853, under the direction of Jefferson Davis, secretary of war, various expeditions were sent out to explore the routes proposed for a railroad from the Mississippi to the Pacific. Congress assembled in Dec. 1853, and in the following January Mr. Douglas, chairman of the senate committee on territories, introduced a bill for the organization of two new territories, Kansas and Nebraska, in the region west of Missouri and north of lat. 36° 30′. By this bill the Missouri compromise act of 1820 was repealed, and slavery allowed to enter where it had been formally and for ever excluded. The measure was warmly supported by the administration and by the leaders of the democratic party, and was strenuously opposed in debates of unprecedented length and interest by Chase and Wade of Ohio, Everett and Sumner of Massachusetts, Seward of New York, Fessenden of Maine, Houston of Texas, and Bell of Tennessee, in the senate, where it finally passed by a vote of 37 to 14. In the house it was opposed among others by Thomas H. Benton of Missouri, who, for 30 years a senator, had now become a representative; but it passed by a vote of 113 to 100, and the bill became a law on the last day of May. This bill roused great excitement and indignation in the free states, where it was denounced as a flagrant breach of faith, and its enactment greatly increased the strength of the anti-slavery party. Much dissatisfaction also was caused in those states by a conference at Ostend between the U. S. ministers to England, France, and Spain, in the circular issued by which it was proposed to buy Cuba from Spain for $120,000,000, or, if necessary to prevent emancipation in the island, to take it by force. The attempt to obtain Cuba was regarded at the North as prompted, like the repeal of the Missouri compromise, chiefly by a desire to extend and strengthen the slaveholding influence in the United States. So also were the fillibuster expeditions against Nicaragua led by William Walker, whose envoy, Vijil, at Washington was formally recognized by the president in 1856. (See WALKER, WILLIAM.) As, by the terms of the Kansas and Nebraska act, the people of those territories were to be left free to determine for themselves whether or not slavery should be tolerated there, a struggle soon began in Kansas, to which chiefly emigration was directed, between the anti-slavery and pro-slavery parties, which, after many acts of violence and a long period of confusion amounting almost to civil war, terminated in the adoption by the people of Kansas of a state constitution excluding slavery. (See KANSAS.) In the course of the debates on the Kansas question Mr. Sumner of Massachusetts made in the senate, May 20, 1856, a speech containing a vehement attack on South Carolina and some of her representatives, for which two days afterward he was assailed in the senate chamber by Preston S. Brooks of that state, and so much injured that he was not able to resume his duties in the senate during that and the succeeding session. This event increased still further the anti-slavery feeling at the North, and when the canvass for president began in 1856, an anti-slavery party appeared in the field of far more formidable dimensions than any previous organization of the kind. This party assumed the name of republican, and absorbed the entire free soil party, the greater part of the whig party, and considerable accessions from the democratic party. The first decisive exhibition of its strength was the election in the congress of 1855–'6 of N. P. Banks, a former democrat, as speaker of the house of representatives. The whig party about this period disappeared from the field, that portion of it opposed to anti-slavery measures having been merged, especially in the South in an organization at first popularly known as the "Know-Nothing party," and then as the American party from its opposition to foreign influence, and particularly to Roman Catholic influence, in our political affairs. This party held a national convention at Philadelphia in Feb. 1856, and, after adopting a platform virtually recognizing the principles of the Kansas-Nebraska act and approving the fugitive slave law, nominated Millard Fillmore for president. The democratic national convention met at Cincinnati, June 2, and reaffirmed the Baltimore platform of 1852, with the addition of resolutions condemning the principles of the American party, recognizing the Kansas-Nebraska act as the only safe solution of the slavery question, affirming the duty of upholding state rights and the Union, and assenting generally to the doctrines of the Ostend circular. The candidates for the nomination for president were Franklin Pierce, James Buchanan, Stephen A. Douglas, and Lewis Cass. On the 17th ballot Mr. Buchanan was unanimously nominated, and John C. Breckinridge of Kentucky was also unanimously chosen candidate for the vice-presidency. The republican national convention met at Philadelphia, June 17, and adopted a platform declaring that "the maintenance of the principles promulgated in the declaration of independence and embodied in the federal constitution is essential to the preservation of our republican institutions, and that the federal constitution, the rights of the states, and the union of the states shall be preserved;" and that "the constitution confers upon congress sovereign power over the territories of the United States for their government, and in the exercise of this power it is the right and the duty of congress to prohibit in the territories those twin relics of barbarism, polygamy and slavery." John C. Fremont was nominated for president by 359 votes, against 196 for John McLean; and William L. Dayton was nominated for vice-president, his principal competitors being Abraham Lincoln, N. P. Banks, Charles Sumner, and David Wilmot. After an animated canvass, the election resulted in the choice of Buchanan and Breckinridge by 174 electoral votes against 114 for Fremont and 8 for Fillmore. The popular vote for Buchanan was 1,838,169, for Fremont 1,341,264, and for Fillmore 874,534. Fillmore received the vote of Maryland, Buchanan the votes of all the other slave states and of New Jersey, Pennsylvania, Indiana, Illinois, and California, and Fremont those of the 11 remaining free states.—President Buchanan appointed as his cabinet Lewis Cass, secretary of state; Howell Cobb, of the treasury; John B. Floyd, of war; Isaac Toucey, of the navy; Jacob Thompson, of the interior; Aaron V. Brown, postmaster-general; and Jeremiah S. Black, attorney-general. With the exception of a rebellion of the Mormons in Utah in 1857–'8, which was suppressed without bloodshed, of the admission into the Union of Minnesota in 1858 and of Oregon in 1859, and of an unsuccessful attempt to purchase Cuba, the chief interest of Mr. Buchanan's administration centred around the slavery controversy, which still continued in Kansas, in the halls of congress, and in the legislatures of the free states. Several of the latter bodies, under the influence of a public opinion which had been gradually growing in opposition to the justice and constitutionality of the fugitive slave law, passed acts designed to impede its operation, and to secure to alleged fugitives the right to trial by jury and to the legal assistance usually given to those charged with criminal offences. These acts were commonly called personal liberty laws, and though they have never in any case been put in practical operation, their existence soon became a subject of complaint on the part of the South against the northern states. A constitution for Kansas framed at Lecompton in 1857 was laid before congress in the session of 1857-'8, and was strongly opposed by the republicans on the ground that it had been fraudulently concocted by the pro-slavery party there, that it did not represent the wishes of the people of Kansas, and that some of its provisions were cunningly framed for the purpose of forcing slavery into the new state in spite of the opposition of the inhabitants. A powerful section of the democratic party, headed by Stephen A. Douglas, sided with the republicans in this matter; but the so called "Lecompton bill," after a parliamentary struggle of extraordinary intensity and duration, was passed by congress by the votes of the democratic majority, led in the house by Alexander H. Stephens of Georgia, and in the senate by Jefferson Davis of Mississippi, John M. Mason of Virginia, and John Slidell of Louisiana. The president lent all his influence to the measure, on the ground that it would pacify the country, and would not prevent Kansas from becoming a free state if the people desired to exclude slavery. This contest, however, resulted in a schism in the democratic party, and eventually in its division into two bodies, one of which looked upon Mr. Douglas as its leader, while the other supported for the presidency John C. Breckinridge of Kentucky. An attempt to excite the slaves to insurrection, made at Harper's Ferry in Oct. 1859, by John Brown of Kansas, for which he was hanged by the authorities of Virginia, Dec. 2, created a profound sensation throughout the country, and caused especial excitement at the South, where it was looked upon by many as indicative of a settled purpose at the North to destroy slavery. (See HARPER'S FERRY.)—The democratic national convention met at Charleston, April 23, 1860, and after a stormy session of 10 days the southern delegates withdrew on the refusal of the northern delegates to agree to a platform conceding to their fullest extent the claims of the slaveholders to carry slavery into the territories. The convention reassembled at Baltimore, June 18, but could not agree, and another secession took place, embracing most of the southern delegates. The convention, however, continued in session, and nominated for president Stephen A. Douglas of Illinois, and for vice-president Herschel V. Johnson of Georgia. The seceders also met in convention on June 28, and nominated for president John C. Breckinridge of Kentucky, and for vice-president Joseph Lane of Oregon. The "constitutional union party," composed mainly of the American party, held its national convention at Baltimore May 9, and nominated for president John Bell of Tennessee, and for vice-president Edward Everett of Massachusetts. This party declared that it recognized "no political principle other than the constitution of the country, the union of the states, and the enforcement of the laws." The republican national convention assembled at Chicago on May 16, and nominated for president Abraham Lincoln of Illinois. His principal competitors for the nomination were W. H. Seward, Simon Cameron, Edward Bates, and S. P. Chase. Hannibal Hamlin of Maine was nominated for vice-president, the other candidates being Cassius M. Clay, N. P. Banks, A. H. Reeder, and John Hickman. The platform adopted by the convention declared that "the maintenance of the principles promulgated in the declaration of independence and embodied in the federal constitution is essential to the preservation of our republican institutions, and that the constitution, the Union, and the rights of the states must and shall be preserved;" and "that the maintenance inviolate of the rights of the states, and especially of the right of each state to order and control its own domestic institutions according to its own judgment exclusively, is essential to that balance of power on which the perfection and endurance of our political fabric depends." The platform also denounced John Brown's invasion of Virginia as lawless and unjustifiable, declared that "the new dogma that the constitution, of its own force, carries slavery into any or all of the territories of the United States, is a dangerous political heresy," and denied "the authority of congress, of a territorial legislature, or of any individuals to give legal existence to slavery in any territory of the United States." The result of the presidential election of Nov. 1860, was that Mr. Lincoln received the electoral votes of all the free states (except three votes in New Jersey, which were given to Mr. Douglas), to the number of 180, and was elected. Mr. Bell received the votes of Virginia, Kentucky, and Tennessee, 39; Mr. Douglas the 9 votes of Missouri, which added to 3 from New Jersey gave him a total of 12 votes; and the remaining southern states cast their 72 electoral votes for Breckinridge. The popular vote for Lincoln was 1,857,610, for Douglas about 1,365,976, for Breckinridge 847,952, and for Bell 590,631. On Nov. 10, when this result was known, the legislature of South Carolina ordered the election of a convention to consider the question of secession. The convention assembled Dec. 17, and on Dec. 20 adopted a secession ordinance, declaring that "the union now subsisting between South Carolina and other states, under the name of the United States of America, is hereby dissolved." A declaration of the reasons for secession was issued by the convention, in which it was said: "We assert that 14 of the states have deliberately refused for years past to fulfil their constitutional obligations, and we refer to their own statutes for proof. . . . . . In many of these states the fugitive is discharged from the service of labor claimed, and in none of them has the state government complied with the stipulations made in the constitution. . . . . . . Thus the constitutional compact has been deliberately broken and disregarded by the non-slaveholding states; and the consequence follows that South Carolina is released from her obligation." No allusion was made in this declaration to the tariff or to any other causes of complaint than those above alleged and "the election of a man to the high office of president of the United States whose opinions and purposes are hostile to slavery." A few days afterward the state forces seized the U. S. custom house, post office, and arsenal in Charleston, and Forts Pinckney and Moultrie in the harbor of that city, Major Anderson, the U. S. commander, who had only about 80 men, having withdrawn his command into Fort Sumter. The movements of South Carolina were rapidly imitated by other slave states. Mississippi seceded Jan. 9, Florida Jan. 10, Alabama Jan. 11, Georgia Jan. 19, Louisiana Jan. 26, and Texas Feb. 1. Everywhere throughout these states the arsenals, custom houses, navy yards, and forts belonging to the United States were seized by the secessionists, with the exception of Fort Sumter, and Fort Pickens in Florida, which last was preserved by the decided action of Lieut. Slemmer, its commander. The posts at the southern extremity of Florida also remained in the hands of the government. The army at the beginning of active measures on the part of the South was only 16,000 strong, and by orders from Mr. Floyd, the secretary of war, who was himself a party to the secession movement, had been dispersed in the remotest parts of the country, while the navy was mostly absent on foreign stations. Under Mr. Floyd's orders also an extensive transfer of arms from northern to southern arsenals was made during 1860, 115,000 muskets having been transferred by one order, and great quantities of cannon and ammunition by other orders. Congress assembled at Washington, Dec. 3, 1860, and the president's annual message was mainly devoted to the consideration of the secession movement. He recommended, as the most effectual mode of stopping the revolution, an amendment of the constitution embracing these three points: 1, an express recognition of the right of property in slaves in the states where it now exists or may hereafter exist; 2, the duty of protecting this right in all the common territories throughout their territorial existence, and until they shall be admitted as states into the Union with or without slavery as their constitutions may prescribe; 3, a like recognition of the right of the master to have his slave, who has escaped from one state to another, restored and delivered up to him, and of the validity of the fugitive slave law enacted for this purpose, together with a declaration that all state laws impairing or defeating this right are violations of the constitution and are consequently null and void. "Such an explanatory amendment would, it is believed, for ever terminate the existing dissensions, and restore peace and harmony among the states." This part of the message was referred in the senate to a committee of 13, who reported on Dec. 31 that they had not been able to agree upon any general plan of adjustment. Mr. Crittenden, a senator from Kentucky, and a leader of the American party, introduced on Dec. 18 a plan of compromise, proposing to renew the Missouri line of 36° 30′; to prohibit slavery north, and permit it south of that line; to admit new states with or without slavery as their constitutions might provide; to prohibit congress from abolishing slavery in the states and in the District of Columbia so long as it exists in Virginia or Maryland; to permit free transmission of slaves by land or water in any state; to pay for fugitive slaves rescued after arrest; to ask the repeal of personal liberty laws in the states; these concessions to be submitted to the people as amendments to the constitution, and if adopted never to be changed. These were rejected, and the following resolutions, offered by Mr. Clark of New Hampshire, a republican senator, adopted: "That the provisions of the constitution are ample for the preservation of the Union, and the protection of all the material interests of the country; that it needs to be obeyed rather than amended; and that an extrication from the present dangers is to be looked for in strenuous efforts to preserve the peace, protect the public property, and enforce the laws, rather than in new guaranties for particular interests, compromises for particular difficulties, or concessions to unreasonable demands. That all attempts to dissolve the present Union, or overthrow or abandon the present constitution, with the hope or expectation of constructing a new one, are dangerous, illusory, and destructive; that, in the opinion of the senate of the United States, no such reconstruction is practicable, and therefore to the maintenance of the existing union and constitution should be directed all the energies of all the departments of the government, and the efforts of all good citizens." These resolutions expressed substantially the position of the republicans in congress, who had become the majority in both houses by the withdrawal of the democratic senators and representatives from the seceded states. About the time that they were adopted, the legislature of Virginia passed resolutions recommending each of the states to appoint commissioners to a convention, the object of which should be "to adjust the present unhappy controversies." This proposition was approved by the president, and most of the loyal states promptly responded by appointing delegates. None appeared from the seceded states. The convention assembled at Washington, Feb. 4, 1861, and chose John Tyler of Virginia as chairman. After a session of 3 weeks the convention laid before congress a series of proposed amendments to the constitution, to the following effect: 1, prohibiting slavery N. of lat. 36° 30′ in territories, but tolerating it in states, and forbidding all congressional or territorial legislation against slavery S. of that line; 2, prohibiting any future acquisition of territory without the concurrence of a majority of senators both from slave and free states; 3, prohibiting congress from regulating, abolishing, or controlling slavery within any state, from interfering with or abolishing slavery in the District of Columbia or other places under exclusive federal jurisdiction, and from taxing slaves at a higher rate than land; 4, authorizing the states to enforce the rendition of fugitive slaves; 5, prohibiting the foreign slave trade. Another section provided for the payment from the U. S. treasury of the value of a fugitive slave whose rendition was prevented by mobs or by any violence or intimidation. The first, third, and fifth of these sections were to be permanent parts of the constitution, not to be abolished or amended without the consent of all the states. These propositions, however, were all rejected by congress, which had long had under consideration a variety of similar measures, all of which failed to secure a sufficient number of votes. The following amendment to the constitution was however recommended by the house by a two thirds vote of 133 to 65: "No amendment shall be made to the constitution which will authorize or give to congress the power to abolish or interfere within any state with the domestic institutions thereof, including that of persons held to service or labor by the laws of said state." While these discussions were going on in congress, the cabinet of President Buchanan was disturbed and perplexed on the subject of reënforcing the forts in Charleston harbor, a measure opposed with the utmost pertinacity by Mr. Floyd, the secretary of war, and insisted upon by Gen. Cass, the secretary of state, who on Dec. 14 resigned his office in consequence of the president's refusal to order reënforcements. Four days before, Howell Cobb, the secretary of the treasury, had resigned and returned to his residence in Georgia, where he immediately took an active part in the secession movement. His place was filled by Philip F. Thomas of Maryland, while Mr. Black, the attorney-general, was appointed temporary secretary of state. Shortly afterward, on the unexpected movement of Major Anderson from Fort Moultrie to Fort Sumter, and the president's refusal to comply with his demand for the entire withdrawal of the garrison from Charleston harbor, Mr. Floyd resigned, and Joseph Holt, who had been appointed postmaster-general on the death of Aaron V. Brown in 1859, was authorized to administer the affairs of the war department. Not long after Mr. Floyd's resignation he was indicted by the grand jury of the District of Columbia as being privy to the abstraction of bonds to the amount of $870,000 from the department of the interior in the latter part of 1860. His services to the cause of secession by supplying the southern states with arms from northern arsenals had been of the highest value, and he was soon made a brigadier-general in the army of the seceded states. On Dec. 29 commissioners from South Carolina, who had recently arrived in Washington, endeavored to open negotiations with the president for the surrender to South Carolina of the U. S. forts and other national property within her borders. The president declined to receive them as commissioners, or to surrender or evacuate Fort Sumter, and permitted his cabinet to make an attempt to send reënforcements to Major Anderson by the steamer Star of the West, which left New York Jan. 5, 1861, and arrived off Charleston on the morning of the 9th; but she was fired at from batteries manned by the forces of the state, and compelled to retire without effecting her purpose. This led to the immediate resignation of Jacob Thompson, secretary of the interior, and his return to his own state of Mississippi, from the revolutionary government of which he had while still in office received and acted upon a commission to visit and promote the secession of North Carolina. A few days later Mr. Thomas, also disapproving of the attempt to reënforce Fort Sumter, withdrew from the treasury department, and was succeeded by John A. Dix of New York, who was believed to be in favor of vigorous measures for maintaining the authority of the government. The legislatures of New York, Ohio, and Massachusetts at this time offered the whole military power of those states to the president, while the South Carolina legislature declared that any attempt to reënforce Fort Sumter would be an act of war. No further attempt, however, was made at reënforcement during the administration of President Buchanan, which came to an end March 4, 1861. On the same day Mr. Lincoln was inaugurated at Washington without any disturbance of the peace, for the preservation of which a small military force had been assembled under the direction of Gen. Scott. In his inaugural address the president began by declaring that the accession of a republican administration afforded no ground to the southern states for apprehending any invasion of their rights. He said: "I have no purpose, directly or indirectly, to interfere with the institution of slavery in the states where it exists. I believe that I have no lawful right to do so, and I have no inclination to do so. Those who nominated and elected me knew that I had made this and many similar declarations, and had never recanted them." He proceeded to argue that no state upon its own mere motion can lawfully go out of the Union; that resolves and ordinances to that effect are legally void; and that acts of violence within any state or states against the authority of the United States are insurrectionary or revolutionary according to circumstances. "I therefore consider that in view of the constitution and the laws, the Union is unbroken; and to the extent of my ability I shall take care, as the constitution itself expressly enjoins upon me, that the laws of the Union be faithfully executed in all the states." President Lincoln appointed as his cabinet William H. Seward, secretary of state; Salmon P. Chase, of the treasury; Simon Cameron, of war; Gideon Welles, of the navy; Caleb B. Smith, of the interior; Edward Bates, attorney-general; and Montgomery Blair, postmaster-general. The last two were from the slave states of Missouri and Maryland.—Meantime the seceded states had been making vigorous efforts to organize and sustain a general government for themselves. On Feb. 4, 1861, a congress composed of delegates from South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana met at Montgomery, Ala. Howell Cobb was elected chairman. A constitution for the provisional government of the "Confederate States of America" was adopted, which generally resembled that of the United States, and was shortly afterward superseded by a permanent constitution adopted by the congress March 11. This latter document follows in nearly all its parts the language and arrangement of the constitution of the United States. The main points of difference are contained in the following clauses: "Congress may by law grant to the principal officer in each of the executive departments a seat upon the floor of either house, with the privilege of discussing any measures appertaining to his department." "No bounties shall be granted from the treasury, nor shall any duties or taxes on importations be levied to promote or foster any branch of industry." "The citizens of each state . . . . shall have the right of transit and sojourn in any state of this confederacy with their slaves and other property; and the right of property in said slaves shall not be thereby impaired." "No slave or other person held to service or labor in any state or territory of the Confederate States, under the laws thereof, escaping or lawfully carried into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such slave belongs, or to whom such service or labor may be due." "The Confederate States may acquire new territory . . . . in all such territory the institution of negro slavery as it now exists in the Confederate States shall be recognized and protected by congress and by the territorial government; and the inhabitants of the several Confederate States and territories shall have the right to take to such territory any slaves lawfully held by them in any of the states or territories of the Confederate States." Internal improvements by the confederate government are prohibited; removals from office, with the exception of cabinet offices, must be for cause and reported to the senate with the reasons therefor; and finally, the term of office for the president and vice-president is established at 6 years, the president not being reëligible. The congress elected Jefferson Davis president and Alexander H. Stephens vice-president by a unanimous vote, and they were inaugurated Feb. 18. Robert Toombs was appointed secretary of state, Charles G. Memminger of the treasury, L. Pope Walker of war, and John H. Reagan postmaster-general. The cabinet was subsequently modified by the substitution of R. M. T. Hunter for Robert Toombs as secretary of state, and by the appointment of Stephen R. Mallory as secretary of the navy and Judah P. Benjamin as attorney-general. Mr. Stephens, in a speech at Savannah, thus explained the principles on which the new government was founded: "The new constitution has put at rest for ever all the agitating questions relating to our peculiar institutions—African slavery as it exists among us—the proper *status* of the negro in our form of civilization. This was the immediate cause of the late rupture and present revolution. Jefferson, in his forecast, had anticipated this as the rock upon which the old Union would split. . . . . The prevailing ideas entertained by him and most of the leading statesmen at the time of the formation of the old constitution, were that the enslavement of the African was in violation of the laws of nature; that it was wrong in principle, socially, morally, and politically. . . . . Our new government is founded upon exactly the opposite ideas; its foundations are laid, its corner stone rests upon the great truth that the negro is not equal to the white man; that slavery, subordination to the superior race, is his natural and normal condition. This, our new government, is the first in the history of the world based upon this great physical, philosophical, and moral truth." A confederate army was organized, and officered in part by men who had resigned commissions in the army of the United States in consequence of the secession of the states of which they were natives or citizens. One of these officers, Gen. P. G. T. Beauregard, who had been a major in the service of the United States, was sent on March 3 to take command of the confederate forces at Charleston. About the same time commissioners were sent to England, France, Russia, and Belgium to ask the recognition of the Confederate States as an independent nation; and three commissioners were sent to the government of the United States, who reached Washington March 5, but were not received or recognized in any official manner.—On April 8 the government at Washington, in accordance with a previous agreement, notified to Gen. Beauregard their intention of reënforcing Fort Sumter, and he was accordingly instructed by the confederate authorities to attempt its reduction. Fire was opened on the 12th, and after a bombardment of 34 hours Major Anderson surrendered with all the honors of war, and sailed with his garrison for New York. The next day (April 15) President Lincoln issued a proclamation calling upon the governors of the several states for a force of 75,000 militia to serve for three months, and assist in reoccupying the forts, arsenals, and other property which had been wrested from the government. The utmost enthusiasm was aroused throughout the North. The first companies of troops marched into Boston the same day, and the 6th regiment of Massachusetts militia started for Washington the day after. The governors of Virginia, North Carolina, Tennessee, Kentucky, and Missouri refused to furnish their quota; but the deficiency was more than made up from the other states, over 77,000 men being assembled in the field within an incredibly short space of time. The southern party professed to regard this as a declaration of war, and began to move troops toward Virginia, undoubtedly with the purpose of seizing Washington, and securing the uncertain adhesion of the border states to the southern confederacy. The capital, however, was soon defended by too strong a force to be attacked, and a contemplated insurrection in Maryland was kept down by the prompt action of Gen. B. F. Butler of Massachusetts, who marched a detachment of northern troops from Annapolis to Baltimore, and occupied Federal hill, which, with Fort McHenry in the harbor, entirely commanded the city. Before this was effected, a Massachusetts and a Pennsylvania regiment had been attacked by a mob while passing through Baltimore (April 19), and a few lives lost in the encounter. The state convention of Virginia, which was then sitting, passed an ordinance of secession, to take effect when ratified by a vote of the people; but until that vote should be taken the state and all its military force were placed under the control of the confederate government. A similar course was adopted by Tennessee, though in both these states there was a very strong party devoted to the Union, eastern Tennessee and western Virginia being almost unanimously loyal, and the latter subsequently petitioning for admission into the Union as a separate state. The governor of Maryland at first counselled his state to remain neutral, but finally called out the quota of militia required of him by President Lincoln. Arkansas seceded May 6, and North Carolina May 21. Missouri and Kentucky decided to remain neutral. The number of seceded states now reached 11, a limit not since passed. The confederate congress adjourned from Montgomery May 21, to meet at Richmond July 20. Previous to its adjournment a permanent constitution had been framed and ratified by the states, in place of the provisional constitution previously adopted. In the mean time the confederates continued to seize all the military posts within their reach. The U. S. arsenal at Harper's Ferry, Va., fell into their hands April 18, the garrison first setting fire to the building and destroying most of the arms. Preparations were also made to take possession of the Gosport navy yard, near Norfolk, Va., where, beside several useless vessels, were then the steam frigate Merrimac, receiving ship of the line Pennsylvania, sloops of war Germantown, Plymouth, and Cumberland, and brig Dolphin. The officers in command, despairing of a defence, set fire to the Pennsylvania (April 20), and scuttled and sunk all the other vessels except the Cumberland, which they succeeded in getting out of the harbor. The buildings in the yard were partially burned, but all the ordnance, shot, and shell, of which there were immense quantities, fell into the hands of the confederates. The Merrimac also was comparatively little injured, and, being raised by the confederates and covered with iron armor, became subsequently a formidable engine of war. The condition of the federal government at this time was exceedingly precarious. There was no lack of men at its command, but it was almost destitute of arms; the loss of Harper's Ferry left it with only one arsenal of construction, that of Springfield, Mass.; the navy was scattered all over the world; nearly all the officers of southern birth in both army and navy were resigning, and all the departments were teeming with persons of at best doubtful loyalty. Agents were at once sent abroad to purchase arms; the private manufactories in the northern states were worked to their utmost capacity; vessels were recalled from distant stations; and the navy department proceeded to buy or charter numbers of merchant vessels and fit them out for purposes of war. On April 19 the president proclaimed a blockade of all ports in the seceding states. On May 3 he called for 42,000 volunteers, to serve for 3 years or the war, 22,714 men to be added to the regular army, and 18,000 seamen for the navy. Persons of known or suspected treasonable conduct were arrested by order of the secretary of state, and confined in some of the national forts, and military officers were instructed to disregard all writs of *habeas corpus* issued for the release of such prisoners. On May 24 the national forces advanced into Virginia, and took possession of Arlington heights and Alexandria on the Potomac, opposite Washington. Soon afterward Ohio and Indiana troops under Gen. McClellan entered western Virginia. The confederate government issued letters of marque and reprisal, and in order to force foreign nations to raise the blockade prohibited the exportation of cotton except through southern ports. Most of their available troops were brought forward, and posted along a line extending through Virginia from Harper's Ferry to Norfolk. Their strongest position was at Manassas Junction, on the direct road between Washington and Richmond, to which city their seat of government was removed in July, the vote of the people of Virginia, May 23, having confirmed the ordinance of secession. Batteries at the same time were planted along the right bank of the Potomac below Washington, necessitating the presence of a considerable naval force in that river until the spring of the next year. In June and the early part of July several unimportant engagements were fought in eastern Virginia, generally with advantage to the federal side; while the victories of McClellan, Kelley, Dumont, Rosecrans, and Lander in the western part of the state, at Philippi, Rich mountain, and other places, gave them entire command of that region.

About the middle of July the troops in and around Washington, to the number of 40,000, under command of Gen. Irvin McDowell, began to move toward Manassas Junction, where Gen. Beauregard was intrenched with 27,000 men. Gen. Patterson at the same time was posted near Winchester, about 50 m. N. W. of Manassas, with instructions to hold in check the confederate general Joseph E. Johnston, who was stationed there with 16,000 men. McDowell's corps was reduced by the necessity of holding open his lines of communication, by the return of the three months' militia, and by other causes, to such an extent that on reaching Bull run, a small stream near Manassas, he had but 18,000 men left. A severe battle was fought here July 21, victory inclining to the federal side until late in the afternoon, when Gen. Johnston, having eluded Patterson, effected a junction with Beauregard, and the national army was seized with a sudden panic and utterly routed. Their loss was 481 killed, 1,011 wounded, 1,200 prisoners, 27 cannon, and 4,000 muskets; the loss on the other side, according to official report, was 269 killed and 1,483 wounded. The next day Gen. McClellan was placed in command of the army of the Potomac, and soon began to reorganize and discipline his forces, in which the rest of the summer and the following winter were quietly passed. Immediately after the battle of Bull run, congress, which had met in extra session July 4, voted to raise 500,000 men, to serve for three years or the war, and the loyal states answered to the call with even greater enthusiasm than had been aroused at the fall of Fort Sumter. On Aug. 16 the president issued a proclamation forbidding intercourse with the seceded states. The same day Gen. Wool took command at Fortress Monroe, where a considerable force of northern troops had been for some time collected under Gen. Butler. The southern army soon after the battle of Bull run advanced their lines almost within gunshot of Washington, the federal forces remaining encamped partly on Arlington heights and partly on the N. side of the Potomac, above and below Washington. Meanwhile the military operations in other parts of the country were attended with varying success. On Aug. 28 and 29 Forts Hatteras and Clark, at Hatteras inlet, the main entrance to Pamlico sound on the coast of North Carolina, were bombarded and taken by a naval expedition under Com. Stringham; and the day after the confederates evacuated Fort Morgan, at Ocracoke inlet, another entrance to the same waters. A naval expedition under Flag Officer Samuel F. Dupont, consisting of 84 vessels including transports, and carrying 20,000 troops under Gen. T. W. Sherman, sailed from Hampton roads on Oct. 29 for Port Royal harbor, near Beaufort, S. C., and on Nov. 7 attacked Forts Walker and Beauregard at the entrance to the harbor. The attack was made by 16 vessels, sailing in an ellipse between the two forts, and delivering fire at each alternately, and resulted after 3 hours' fight in the precipitate flight of the garrisons, leaving between 40 and 50 guns in the possession of the victors. The finest harbor on the southern coast was thus secured as a rendezvous for the blockading squadron, and a base for further operations. Missouri during these events had been almost in a condition of anarchy. Notwithstanding the neutrality which the state had determined to preserve, the governor, Claiborne F. Jackson, and a majority of the legislature, were acting in the interest of the southern confederacy, and having fled from Jefferson City, the seat of government, on the approach of federal troops, were deposed by a state convention, July 30, Hamilton R. Gamble being appointed provisional governor. Gov. Jackson proceeded to Arkansas, where confederate troops were concentrating under Gen. McCulloch for an advance into Missouri. On July 5 a detachment of them under Gen. Rains was defeated at Carthage, in the S. W. part of Missouri, by Col. (now Gen.) Sigel, and on Aug. 10 another battle was fought at Wilson's creek, or Dug Spring, near Springfield, in the same part of the state, in which the federal general Lyon was killed. Col. Sigel, upon whom the command then devolved, fell back to Rolla, near the centre of the state, and the whole of S. Missouri, with its valuable lead mines, was thus abandoned to the enemy. In the mean time Gen. Fremont had been appointed to the command of the western department (July 9), and on Aug. 31 proclaimed martial law in all that part of Missouri which was occupied by the national army. A memorable incident of the struggle in Missouri was the defence of Lexington, on the Missouri river in the W. part of the state, by 2,700 men under Col. James B. Mulligan, who held out for 8 days against an army of 26,000 commanded by Sterling Price, and only surrendered (Sept. 20) after they had been two days cut off from their supplies of water. A month later, having organized a force after almost incredible difficulties, Fremont took the field and drove the confederates by degrees back to the S. W. corner of the state. On the eve of a battle which was to decide the possession of Missouri, he was superseded by Gen. Hunter (Nov. 2), and the Union army again retreated toward St. Louis, the enemy under Gen. Sterling Price advancing as they receded. On the 18th Gen. Halleck took command of the department, and by the end of December Price was again in full retreat toward Arkansas, losing within a few days 2,500 prisoners and a large amount of stores. About Oct. 1 the confederate army before Washington began to fall back, and the national lines to be pushed forward. On the 21st a portion of Gen. Stone's command, having crossed the Potomac at Ball's bluff or Edwards's ferry, about midway between Harper's Ferry and Washington, was disastrously defeated by the confederate general Evans, with a loss of 900 out of 2,100 men. Col. E. D. Baker, U. S. senator from Oregon, was among the killed. On Nov. 1 Gen. Scott, general-in-chief of the armies of the United States, retired from active service, and was succeeded by Gen. George B. McClellan. About this time the Union men of East Tennessee, who had been hitherto kept in subjection by the secession party, began to make various demonstrations of loyalty to the Union, and destroyed a number of bridges on the confederate lines of communication. On Nov. 6 the confederate states held an election for president and vice-president under their permanent constitution. Davis was chosen president and Stephens vice-president for the term of 6 years, and were inaugurated in the following February. On Nov. 8 Capt. Charles Wilkes, in command of the frigate San Jacinto, while searching for privateers in the West Indies, intercepted the British mail steamer Trent from Havana for Southampton, and on his own responsibility forcibly took from on board Messrs. Mason and Slidell, commissioners from the southern confederacy to England and France. The action was resented by the British government as an insult to their flag, and produced a great display of feeling against the United States; and a war with England seemed imminent, when the president decided to surrender the commissioners to the British minister, holding that although the commissioners were contraband of war, on the principles which the British government had formerly maintained and never openly renounced, yet on the principles of international law uniformly advocated by the United States, Capt. Wilkes had no right to seize their persons without taking the vessel on which they were found into port to be condemned by a prize court. On Dec. 20 Brig. Gen. Ord routed the confederates with heavy loss at Dranesville, on the road from Washington to Leesburg. By the end of the year the United States had enlisted about 640,000 men, without counting the 77,000 militia called out in April, who had been discharged at the end of their 3 months' service, nor the regular army, which it was estimated amounted at that time to 20,000. In July the army of the Confederate States had been officially returned as 210,000 strong, and President Davis had been authorized to accept 400,000 more volunteers. The contest had extended along the whole boundary line between the loyal and the seceding states, and both sides had been making vigorous preparations for a struggle for the possession of the Mississippi river. The federal troops had a base of operations at Cairo, Ill., where the Ohio and the Mississippi unite, and under orders of the war department were fitting out at that point a formidable fleet of gun and mortar boats. The whole river, from a spot a few miles below Cairo to its mouth, was in the possession of the confederates. The soil of Kentucky had hitherto been respected as neutral by both parties; but about Sept. 1 Bishop Polk of Louisiana, who had received a commission as major-general in the confederate army, occupied Hickman and Columbus on the Mississippi, and began to fortify them. Gen. Grant, commander of the federal forces at Cairo, immediately took possession of Paducah, on the Ohio just below the mouth of the Tennessee. Within a few days Gen. Zollicoffer led a confederate force from Tennessee into S. E. Kentucky, where on Oct. 21 he was defeated at Camp Wild Cat by a small body of federals under Gen. Schoepf; and Gen. Buckner occupied Bowling Green, a place of great natural strength at the junction of the railroads from Memphis and Nashville to Louisville, about the centre of the S. part of the state. These positions formed part of a line of posts commencing at the Mississippi river and stretching through S. Kentucky and N. Tennessee to Cumberland Gap, an important pass in the Cumberland mountains near the spot where the W. boundary of Virginia touches the boundary between Tennessee and Kentucky. The principal military positions on this line were Columbus on the Mississippi, Fort Henry on the Tennessee, Fort Donelson on the Cumberland, Bowling Green, and Mill Spring in S. Kentucky. On Dec. 17 a Union victory was gained at Munfordsville on Green river, near the centre of Kentucky; and on Jan. 19, 1862, Gen. Thomas achieved a more decisive success at Mill Spring, or Somerset, where Zollicoffer's army, of which Gen. George B. Crittenden then held the chief command, was routed, and Zollicoffer himself was killed. On Jan. 20 Simon Cameron resigned the office of secretary of war, and Edwin M. Stanton of Pennsylvania was appointed in his place. On Feb. 6 Capt. Foote with a fleet of gunboats reduced Fort Henry, Gen. Tilghman with his staff and about 60 men becoming prisoners of war. On the 15th Bowling Green was evacuated, the forces retiring to Fort Donelson, which was assaulted by Gen. Grant and surrendered next day, Gen. Buckner and 16,000 men falling into his hands. The evacuation of Nashville, Tenn., followed as a necessary consequence on the 25th, and that of Columbus about March 1. The whole of Kentucky and a part of Tennessee were thus secured by the federal arms. The legislature and executive officers of Tennessee fled from Nashville to Memphis, and Senator Andrew Johnson was appointed by President Lincoln military governor of the state, with the rank of brigadier-general. An unexpectedly strong Union sentiment was at once discovered in the western as well as the eastern counties; the city council of Nashville requested the mayor to have the U. S. flag displayed on all the public buildings (April 14), and a number of the principal citizens issued a call (May 4) for a public meeting to take measures for the reëstablishment of the federal authority in Tennessee. While these events were taking place, another naval and military expedition was fitted out and placed under the command of Gen. Burnside. It sailed from Hampton roads, Jan. 12, entered Pamlico sound by way of Hatteras inlet, and attacked Roanoke island, which separates Pamlico from Albemarle sound, and which the confederates had strongly fortified. The attack was opened Feb. 7 by the gunboat fleet under Flag Officer Goldsborough; and while the bombardment was in progress the troops landed, stormed the intrenchments, and obliged 2,500 of the enemy to surrender. On the 8th the fleet passed up the sound to Elizabeth City, N. C., captured one and destroyed 4 of the 7 gunboats forming the confederate flotilla, and occupied several towns in North Carolina. On March 14 Gen. Burnside captured Newbern, N. C., after a severe battle, taking 200 prisoners and 64 guns, and immediately afterward marched a force by land thence to Beaufort, the best harbor in that state. The town made no resistance, but Fort Macon, which defends the entrance to it from the sea, held out until April 25. From Port Royal expeditions under Capt. Dupont proceeded to the principal seaports of Florida, all of which were occupied with little or no resistance, and operations were pushed forward for the capture of Savannah. Its principal defence, Fort Pulaski, on the Savannah river, was taken April 11, but the federal forces made no immediate movement toward the city itself. On Feb. 18 the right wing of the army of the Potomac, under Gen. Banks, crossed the river at Harper's Ferry and advanced to Charlestown. On March 6 Gen. McClellan began a movement toward Richmond, the enemy falling back as he advanced, and taking up a new line of defence along the Rappahannock. Centreville was occupied on the 11th, and Manassas immediately after. While McClellan's headquarters were still at Fairfax Court House, near Manassas, the rear of his army was quietly embarking at Alexandria for Fortress Monroe, but the movement was soon suspected and guarded against by the enemy. From Fortress Monroe he advanced upon Yorktown (April 4), which was well fortified, and held by a division under Gen. Magruder. The organization of the army was now changed. Gen. McClellan, having taken the field, was relieved from the command of the other military departments, and several new departments were created. Gen. Halleck was assigned to the department of the West; Gen. Hunter to the department of the South, comprising South Carolina, Georgia, and Florida; Gen. Butler to the department of the Gulf; Gen. Fremont to the mountain department in western Virginia and eastern Tennessee; Gen. Banks to the department of the Shenandoah; Gen. McDowell to the department of the Rappahannock; and Gen. McClellan to the department of the Potomac. The frigate Merrimac, which the confederates had equipped as an iron-clad floating battery and ram, on March 8 attacked the United States vessels in Hampton roads. The sailing vessels Congress and Cumberland opened their broadsides upon her without effect, the shot rattling upon her iron sides like hail. She first ran into the Cumberland, which she sank after a short but terrible fire; and then attacked the Congress, which in the course of half an hour was run ashore and compelled to strike her flag, after which she was burned. The steam frigate Minnesota got aground early in the action, and could not come within range. During the night, which put a stop to the work of destruction, Capt. Ericsson's new iron-clad battery Monitor arrived from New York, and the next morning engaged the Merrimac as she was about opening an attack upon the Minnesota. The battle lasted 5 hours, the two vessels several times touching each other, and firing without apparent effect. The Merrimac was finally compelled to retire, after receiving considerable injury from a shot which entered one of her ports. The only damage on board the Monitor was caused by a shot which struck the pilot house and wounded the commander, Lieut. Worden, by driving particles of cement into his eyes. The vessel herself was struck over 20 times, but was entirely uninjured. With the exception of an attack upon some small unarmed merchant vessels, the confederate fleet at Norfolk, which comprised beside the Merrimac the iron-clad steamers Jamestown and Yorktown, made no further movements. In the West the military operations had lost nothing of their importance. A decisive victory was gained by the national forces under Gen. Curtis at Pea Ridge, Ark., March 6, 7, and 8, over the armies of Van Dorn, Price, and McCulloch, which had just been driven out of Missouri. After the evacuation of Columbus and Nashville the confederates took up two strong positions: one at New Madrid, Mo., on the Mississippi, and at Island No. Ten in the river a few miles above that town; and the other at Corinth, in the N. E. corner of Mississippi, near the Tennessee river. New Madrid was taken by Gen. Pope, March 14, and Island No. Ten was attacked by the gunboat fleet of Flag Officer Foote on the 16th. The defences here proved unexpectedly strong. The gunboats were all above the island, and consequently, in the swift current of the Mississippi, could not attack the batteries in the only way they were fitted to attack at short range, namely, with "head on." Gen. Pope at New Madrid was unable to coöperate in a land attack, because the inundated condition of the country prevented his marching his army above the island to the neighborhood of the fleet; and at New Madrid he had no means of crossing the river to the Kentucky shore, where a confederate force was posted. The difficulty was overcome by cutting a canal 12 miles long through the neck of land formed by a bend in the river opposite the island, thus enabling several transports from Foote's fleet to reach New Madrid. Two of the gunboats ran past the batteries in the night, and the crossing having been effected under their protection, the island surrendered on the night of April 7-8, with about 6,000 prisoners, 124 guns, and a great quantity of stores. The main body of the western army under Gen. Grant meanwhile pushed forward toward the confederate position at Corinth. On the 6th their advance guard was attacked at Shiloh, near Pittsburg Landing, on the Tennessee, a few miles from Corinth, by A. S. Johnston and Beauregard. The battle raged from 2 o'clock in the morning until the approach of night, with varying success, but with disadvantage on the whole to the federal troops, who were driven back to the river, where the gunboats enabled them to make a stand. Gen. Johnston was among the killed. During the night both sides were reënforced, and the battle was renewed at 7 the next morning. After a contest of 8 hours the confederate forces broke under a charge of 6 regiments led by Gen. Grant in person, and retreated toward Corinth, closely pursued by the cavalry. At Corinth they had erected works of a quite formidable character, and here they remained for nearly two months, the national army, which had been largely increased and was now commanded by Gen. Halleck, slowly advancing toward their position. Gen. O. M. Mitchel in the mean time, with a small body of federal troops, seized Huntsville on the main line of the Memphis and Charleston railroad in northern Alabama, capturing 200 prisoners, 15 locomotives, and a large number of cars, and in the course of two or three days had occupied 100 miles of the same road, thus cutting off all direct communication between the S. Atlantic states and the West. The entrance of the national troops into Alabama was hailed with joy by numbers of the inhabitants. On May 30 it was discovered that Corinth had been evacuated, every thing of value being removed or destroyed. Gen. Pope was sent in pursuit; but the main body of the enemy, consisting of nearly all the available troops in the whole confederacy with the exception of the army concentrated about Richmond, made good its retreat, and appears to have been broken up into several detached bodies, of which we have not yet (Sept. 1) any certain information. The contest in the West was now confined to the Mississippi, where after the fall of Island No. Ten the confederates had made a stand at Fort Wright, about 50 m. above Memphis. Fire was opened upon this work by the gunboats and mortar vessels, April 18, but without much effect. On May 8 the federal flotilla, commanded by Capt. C. H. Davis (Flag Officer Foote having been disabled by a wound), was attacked here by 8 confederate gunboats, 4 of which were provided with rams. After a sharp conflict of an hour the confederates were driven off, losing 3 of their boats blown up and sunk. On the 31st it was discovered that the fort had been abandoned. The vessels then dropped down to Memphis, where the whole confederate fleet, consisting of 8 gunboats and steam rams, was awaiting its arrival. The federal flotilla had meanwhile been reënforced by 8 or 10 steam rams fitted out under authority from the war department by Col. Charles Ellet. The fight took place June 6, and resulted after an hour and a half, owing in good part to the operations of the ram fleet, in the capture or destruction of 7 of the rebel boats, one escaping by superior speed. Memphis immediately surrendered. On the lower Mississippi a still more important success had been gained by the federal navy. As long ago as November Ship island, near the mouth of the river, had been occupied and made a rendezvous for a military force under Gen. B. F. Butler, designed for the occupation of New Orleans. On April 16 a fleet of 45 vessels, carrying 280 guns and 21 mortars, and commanded by Flag Officer Farragut, the mortar boats being under the special command of Capt. David D. Porter, moved up the river to attack Forts Jackson and St. Philip, on opposite sides of the stream about 75 m. below the city. Both these works were of great strength, and between them a chain had been thrown across the river. The bombardment began on the 18th and lasted 6 days, when Flag Officer Farragut, having broken the chain, ran past the forts with 14 steamers and gunboats, destroyed a squadron of the enemy's rams and gunboats, silenced the batteries above the forts, and occupied New Orleans without further opposition on the 25th; Gen. Mansfield Lovell, in command of the confederate land troops, evacuating it on his arrival, and destroying all the cotton, sugar, and other valuable stores. Forts Jackson and St. Philip surrendered to Capt. Porter on the 28th. Gen. Butler now moved up with his army, took formal possession of New Orleans, and placed it under martial law. Farragut's fleet passed up the river, captured Baton Rouge, and afterward proceeded to Vicksburg, the only remaining stronghold of the confederates on the Mississippi. Here he passed the powerful batteries on shore, joined Flag Officer Davis's flotilla from Memphis, and a bombardment was opened upon the city, and continued till Aug. 1, when it was suspended to await the coöperation of land forces. On the peninsula between the York and James rivers McClellan had commenced the siege of Yorktown April 5, and the confederate army had gradually concentrated at Richmond. Gen. McDowell had moved upon Fredericsburg April 18, and Gen. Banks about the same time moved up the valley of the Shenandoah. On May 4 the confederate troops evacuated Yorktown and Gloucester Point, leaving 71 guns in their works, and retreated toward Richmond, McClellan pursuing them. They were overtaken the next day at Williamsburg, where a sharp action occurred; and on the 7th Gen. Franklin, who had been sent from Washington to reënforce McClellan, landed at West Point on the York river, and defeated a force under Gens. Whiting and G. W. Smith. On the 10th Norfolk was occupied without resistance by a detachment from Fortress Monroe under Gen. Wool, and the iron-plated vessel Merrimac was blown up to prevent it from falling into his hands. The Monitor and several other vessels, including two new and formidable iron-clad gunboats, were sent up the James river to operate against Richmond, but met with obstructions near Fort Darling, a few miles below the city, and were driven back with loss (May 15). The Monitor, though repeatedly struck, was uninjured, but could not elevate her guns enough to produce any impression on the fort, which was situated on a high bluff. Another check was experienced in the valley of the Shenandoah, where Gen. Banks, after penetrating 100 miles and driving the enemy beyond Harrisonburg, was ordered to send most of his troops to McDowell. While thus weakened, having barely 5,000 men left, he was attacked by 20,000 confederate troops under Gen. J. T. Jackson, and his advance, consisting of 900 men under Col. Kenley, was cut off at Front Royal, May 23. By a prompt retreat Banks saved the rest of his army and nearly all his baggage, retiring into Maryland, closely pursued by Jackson as far as the Potomac. This event caused the greatest alarm in Washington, it being at first supposed that the whole army from Richmond was about to cross into Maryland. The governors of Pennsylvania, New York, and the New England states were telegraphed to send on more troops, and several militia regiments immediately set out for Baltimore and the Potomac. Jackson however retreated as rapidly as he had advanced. Fremont, by forced marches across the mountains, endeavored to intercept him, but succeeded only in overtaking his rear guard and forcing a battle at Cross Keys, near Harrisonburg, June 8, in which Jackson was worsted. Another engagement took place the next day at Port Republic, on the Shenandoah, where Jackson attacked the advance of Gen. Shields's corps, and forced it to fall back upon the main body, when he was in turn repulsed. Gen. McClellan meanwhile slowly followed the confederate army up the Yorktown peninsula, until on May 20 he reached the Chickahominy, a small tributary of the James river, flowing through a swampy tract at a distance of from 6 to 15 m. from Richmond. Here a delay was caused by the necessity of constructing bridges and roads. Continual skirmishing occurred, and on the 27th a sharp engagement was fought at Hanover Court House, 16 m. N. of Richmond, where Gen. Fitz John Porter succeeded in cutting off communication with Richmond over the Fredericsburg railroad. Portions of the army had meanwhile crossed the Chickahominy, and by the end of the month the extreme advance was at Fair Oaks, 5 miles from Richmond; the extreme left was on or near James river; and the right extended to the White House, on the Pamunkey, one of the head streams of the York. It was here that the army had its depot of supplies. On the 31st the confederates, taking advantage of a flood in the Chickahominy, attacked the advance under Gen. Casey at Fair Oaks, and drove them back to the river with the loss of their guns and baggage. There they were supported by the divisions of Heintzelman and Kearny, and enabled to maintain the contest till reënforcements were brought across by Sumner, when the confederates were repulsed and the ground that had been lost was recovered. The attack was renewed the next day, but the federal troops were everywhere victorious. Their loss was officially reported as 5,739 killed, wounded, and missing. The confederates were led by Gen. Joseph E. Johnston, who was wounded on the first day. No other battle of importance occurred until June 26, by which time 3 army corps had crossed the Chickahominy. The confederates had been heavily reënforced, and McClellan, convinced of the impossibility of defending his extended lines with the force at his disposal, resolved to transfer his base of operations to the James river. The supplies were accordingly shipped at the White House, and the army prepared to move by the left flank. On the evening of the 26th the enemy under Jackson fell with overwhelming force upon McClellan's right wing at Beaver Dam, and, though driven back late at night, renewed the attack in heavier numbers the next morning. The federals under Fitz John Porter fell back to Gaines's hill, where a bloody contest was maintained until night, the main body of the army being at the same time engaged along its entire line. That night and the next day the whole army and its train were moving toward the James, Franklin with the 6th army corps being left to cover the retreat. Every step of the march was obstinately disputed. The passage of the White Oak swamp especially, June 30, was attended with great slaughter, being accomplished only after a battle which lasted all day. On July 1 the army reached the James river, and there they were again attacked at Malvern hills, but defeated their assailants more completely than in any previous engagement of the 6 days' fight. That night they marched to Harrison's Landing, a position of greater strength some distance below, and about 17 m. from Richmond, where they remained until Aug. 14, protected by a large fleet of gunboats. The federal loss during these 6 days was reported as 1,565 killed, 7,701 wounded, and 5,958 missing; total, 15,224. The corps of Fremont, Banks, and McDowell were consolidated, June 26, into the "army of Virginia," and placed under the command of Major-Gen. Pope. In consequence of this appointment Gen. Fremont asked leave to retire from active service, and was replaced by Gen. Sigel. On July 1 the president called for 300,000 more volunteers to serve during the war. On the 11th Major-Gen. Halleck was appointed to the command of all the land forces of the United States as general-in-chief, Gen. Grant succeeding him in command of the army of the Mississippi. On June 16, Gen. Hunter, with all the available forces at Port Royal, made an unsuccessful demonstration upon James island near Charleston, where the enemy were intrenched at a place called Secessionville. The federal troops, commanded by Gen. Benham, were repulsed after a fight of 5 hours, with a loss estimated at 700. On the 18th Gen. Morgan, of the U. S. volunteers, seized Cumberland Gap, the main gate of communication between Kentucky and eastern Tennessee. On the 11th the army under Gen. Curtis arrived safely at Helena, Ark., where it remained till about Aug. 12, when it moved upon Little Rock. Missouri, Kentucky, and Tennessee were now overrun by guerilla bands, who inflicted great damage upon the Union inhabitants. Toward the latter part of July, the provisional governor of Missouri ordered a draft of the whole militia of the state to resist them. Murfreesborough, Tenn., was captured on July 13 by a force composed chiefly of guerillas. On the 15th the confederate iron-clad ram Arkansas engaged a part of Flag Officer Davis's flotilla near the mouth of the Yazoo river, injured several of the vessels, and ran through the rest of the fleet to Vicksburg. On Aug. 4 she left Vicksburg to take part in a confederate attack on Baton Rouge, and on the 6th she was attacked near that place by the U. S. gunboat Essex, Commander W. D. Porter, and after an action of about 20 minutes she took fire and was blown up. At the same time the attack of the confederate land forces, some 10,000 strong, led by John C. Breckinridge, was repelled after a spirited action by the federal army, about 4,500 strong, under Brig. Gen. Thomas Williams, who fell in the action. The losses on both sides were heavy. On Aug. 9 a hotly contested battle was fought at Cedar Mountain, 8 m. S. of Culpepper Court House, Va., between a corps of Gen. Pope's army commanded by Gen. Banks, and a confederate army which had made a rapid advance from Richmond under command of Gen. Jackson. The attack of the confederates was unsuccessful, notwithstanding their superiority of numbers, and on the following day they retired in the direction of Richmond. The federal loss in this battle was about 1,500 killed, wounded, and prisoners. The first important measure of Gen. Halleck, in assuming the chief command of the federal armies, was to order the army of the Potomac to retreat from its position at Harrison's landing to Yorktown and Fortress Monroe, with a view to its transfer to the Rappahannock and its direct coöperation with the army of Virginia under Gen. Pope. This difficult and perilous movement was begun on Aug. 14, Gen. Fitz John Porter's corps leading the march and arriving at Newport News, its place of embarkation, on the 18th, without being disturbed by the enemy; the other corps accomplished the movement with equal success. Meanwhile, on Aug. 4, an order was issued by the president calling for an additional force of 300,000 men to serve for 9 months, to be raised by drafting. This order, instead of checking the popular enthusiasm, gave it an astonishing stimulus, under which the work of filling up the number of the 300,000 volunteers required by the order of July 1 was prosecuted with remarkable energy; the western states especially declared themselves ready to raise more than their quotas, and now (Sept. 1) the whole levy of 300,000 is fully armed, equipped, and the greater part of these new forces are already in the field. A large portion of them have been sent to serve in the department of Ohio, created Aug. 19, comprising the states of Indiana, Ohio, and Kentucky, and including Cumberland Gap and the region about it in Tennessee, under the command of Maj. Gen. H. G. Wright.—The extra session of congress which began July 4, 1861, closed on Aug. 6. Its chief acts were for the providing of ways and means to carry on the war, and for this the duties on certain imports were increased, and a loan of $250,000,000 was authorized, together with an issue of $50,000,000 in treasury notes. The first regular session began Dec. 2, 1861, and ended July 17, 1862. Mr. Breckinridge, the late vice-president, who had appeared as a senator at the extra session, was expelled for treason in having openly embraced the confederate cause, as were also two members of the house of representatives. Bills were speedily passed for the construction of gunboats on the Mississippi, and of 20 iron-clad vessels of war. By the acts of this session the secretary of the treasury was authorized to issue $150,000,000 more treasury notes, to negotiate $500,000,000 of 6 per cent. bonds, to receive temporary deposits to the extent of $100,000,000 at the rate of 4 per cent., and to issue to all creditors of the government certificates of indebtedness. A tax law levying a duty of 3 per cent. on the products of all kinds of labor and the net profits of every description of business was passed, as was also a tariff adding about 5 per cent. to previously established duties. Slavery was abolished in the district of Columbia, and prohibited in all the territories of the United States, present or to come. On the recommendation of President Lincoln, a resolution was passed offering to any state which will abolish slavery an indemnity sufficient to remunerate the slaveholders. The army was ordered to receive within its lines all fugitive slaves, and not to surrender them to their owners; and the president was authorized to employ the slaves in the military or naval service at his discretion, the slaves of all open rebels being declared free. An act confiscating all the property of rebels and emancipating their slaves completes the list of important anti-slavery measures effected by this congress. The supreme court was reorganized by apportioning the judicial circuits according to population, thus giving to the free states 6 of the 9 judges. A homestead act and a Pacific railroad act were also passed by this congress, which has perhaps encountered more serious responsibility, and undertaken and carried through a series of legislative measures of more consequence to the country, than any other congress since the foundation of the government.

TABLE I.—DATE OF ADMISSION OR ORGANIZATION, AREA, AND POPULATION OF THE STATES AND TERRITORIES, 1790—1860.

States and Territories.	Date.	Area in square miles.	Total population. 1790.	1800.	1810.	1820.	1830.	1840.	1850.	1860.
Maine	1820	31,766	96,540	151,719	228,705	298,335	399,455	501,793	583,169	628,279
New Hampshire*	1788	9,280	141,899	183,762	214,360	244,161	269,328	284,574	317,976	326,073
Vermont	1791	9,056	85,416	154,465	217,713	235,764	280,652	291,948	314,120	315,098
Massachusetts*	1788	7,800	378,717	423,245	472,040	523,287	610,408	737,699	994,514	1,231,066
Rhode Island*	1790	1,046	69,110	69,122	77,031	83,059	97,199	108,830	147,545	174,620
Connecticut*	1788	4,780	238,141	251,002	262,042	275,202	297,675	309,978	370,792	460,147
New York*	1788	50,519	340,120	586,756	959,049	1,372,812	1,918,608	2,428,291	3,097,394	3,880,735
New Jersey*	1787	8,320	184,139	211,949	245,555	277,575	320,823	373,306	489,555	672,035
Pennsylvania*	1787	46,000	434,373	602,361	810,091	1,049,458	1,348,233	1,724,033	2,311,786	2,906,115
Delaware*	1787	2,120	59,096	64,273	72,674	72,749	76,748	78,085	91,532	112,216
Maryland*	1788	11,124	319,728	341,548	380,546	407,350	447,040	470,019	583,034	687,049
Dist. of Columbia	1790	60	....	14,093	24,023	33,039	39,834	43,712	51,687	75,080
Virginia*	1788	61,352	748,308	880,200	974,622	1,065,379	1,211,405	1,239,797	1,421,661	1,596,318
North Carolina*	1789	45,000	393,751	478,103	555,500	638,829	737,987	753,419	869,039	992,622
South Carolina*	1788	30,213	249,073	345,591	415,115	502,741	581,185	594,398	668,507	703,708
Georgia*	1788	58,000	82,548	162,101	252,433	340,987	516,823	691,392	906,185	1,057,286
Florida	1845	59,268	....	....	....	....	34,730	54,477	87,445	140,425
Alabama	1819	50,722	....	....	....	127,901	309,527	590,756	771,623	964,201
Mississippi	1817	47,156	....	8,850	40,352	75,448	136,621	375,651	606,526	791,305
Louisiana	1812	41,255	....	....	76,556	153,407	215,739	352,411	517,762	708,002
Texas	1845	237,504	....	....	....	....	....	....	212,592	604,215
Arkansas	1836	52,198	....	....	....	14,273	30,388	97,574	209,897	435,450
Tennessee	1796	45,600	35,791	105,602	261,727	422,813	681,904	829,210	1,002,717	1,109,801
Kentucky	1792	37,680	73,077	220,955	406,511	564·317	687,917	779,828	982,405	1,155,684
Ohio	1802	39,964	....	45,365	230,760	581,434	937,903	1,519,467	1,980,329	2,339,502
Michigan	1837	56,243	....	....	4,762	8,896	31,639	212,267	397,654	749,113
Indiana	1816	33,809	....	4,875	24,520	147,178	343,031	685,866	988,416	1,350,428
Illinois	1818	55,405	....	....	12,282	55,211	157,445	476,183	851,470	1,711,951
Wisconsin	1848	53,924	....	....	....	....	....	30,945	305,391	775,881
Minnesota	1858	81,259	....	....	....	....	....	....	6,077	173,855
Iowa	1846	50,914	....	....	....	....	....	43,112	192,214	674,948
Missouri	1821	67,380	....	....	20,845	66,586	140,455	383,702	682,044	1,182,012
Kansas	1861	78,418	....	....	....	....	....	....	....	107,206
California	1850	155,500	....	....	....	....	....	....	92,597	379,994
Oregon	1859	80,000	....	....	....	....	....	....	13,294	52,465
Washington	1853	176,141	....	....	....	....	....	....	....	11,594
Nevada	1861	45,812	....	....	....	....	....	....	....	6,857
Utah	1850	181,820	....	....	....	....	....	....	11,380	40,273
New Mexico	1850	220,000	....	....	....	....	....	....	61,547	93,516
Colorado	1861	106,818	....	....	....	....	....	....	....	34,277
Nebraska	1854	122,007	....	....	....	....	....	....	....	28,841
Dacotah	1861	318,128	....	....	....	....	....	....	....	4,837
Persons in U. S. navy		....	....	....	....	....	5,318	6,100	....	....
Total		2,819,811	3,929,827	5,305,937	7,239,814	9,638,191	12,866,020	17,069,453	23,191,876	31,445,080

TABLE II.—TOTAL FREE COLORED AND SLAVE POPULATION, 1790—1840.

States and Territories.	1790. Free col'd.	1790. Slaves.	1800. Free colored.	1800. Slaves.	1810. Free colored.	1810. Slaves.	1820. Free colored.	1820. Slaves.	1830. Free colored.	1830. Slaves.	1840. Free colored.	1840. Slaves.
Maine	538	....	818	....	969	....	929	....	1,190	2	1,355	....
New Hampshire	630	158	856	8	970	....	786	....	604	3	537	1
Vermont	255	17	557	....	750	....	903	....	881	....	730	....
Massachusetts	5,463	....	6,452	....	6,737	....	6,740	....	7,048	1	8,669	....
Rhode Island	3,469	952	3,304	381	3,609	108	3,554	48	3,561	17	3,238	5
Connecticut	2,801	2,759	5,330	951	6,453	310	7,844	97	8,047	25	8,105	17
New York	4,654	21,324	10,374	20,343	25,333	15,017	29,279	10,088	44,870	75	50,027	4
New Jersey	2,762	11,423	4,402	12,422	7,843	10,851	12,460	7,557	18,303	2,254	21,044	674
Pennsylvania	6,537	3,737	14,561	1,706	22,492	795	30,202	211	37,930	403	47,854	64
Delaware	3,899	8,887	8,268	6,153	13,136	4,177	12,958	4,509	15,855	3,292	16,919	2,605
Maryland	8,043	103,036	19,587	105,635	33,927	111,502	39,730	107,397	52,938	102,994	62,078	89,737
Dist. Columbia	....	....	783	3,244	2,549	5,395	4,048	6,377	6,152	6,119	8,361	4,694
Virginia	12,766	293,427	20,124	345,796	30,570	392,518	36,889	425,153	47,348	469,757	49,852	449,087
North Carolina	4,975	100,572	7,043	133,296	10,266	168,824	14,612	205,017	19,543	245,601	22,732	245,817
South Carolina	1,801	107,094	3,185	146,151	4,554	196,365	6,826	258,475	7,921	315,401	8,276	327,038
Georgia	398	29,264	1,019	59,404	1,801	105,218	1,763	149,654	2,486	217,531	2,753	280,944
Florida	....	....	....	....	....	....	....	....	844	15,501	817	25,717
Alabama	....	....	....	....	....	....	571	41,879	1,572	117,549	2,039	253,532
Mississippi	....	....	182	3,489	240	17,088	458	32,814	519	65,659	1,366	195,211
Louisiana	....	....	....	....	7,585	34,660	10,476	69,064	16,710	109,588	25,502	168,452
Arkansas	....	....	....	....	....	....	59	1,617	141	4,576	465	19,935
Tennessee	361	3,417	309	13,584	1,317	44,535	2,727	80,107	4,555	141,603	5,524	183,059
Kentucky	114	11,830	741	40,343	1,713	80,561	2,759	126,732	4,917	165,213	7,317	182,258
Ohio	....	....	337	....	1,899	....	4,723	....	9,568	6	17,342	3
Michigan	....	....	....	....	120	24	174	....	261	32	707	....
Indiana	....	....	163	135	393	237	1,230	190	3,629	3	7,165	3
Illinois	....	....	....	....	613	168	457	917	1,637	747	3,598	331
Wisconsin	....	....	....	....	....	....	....	....	....	....	185	11
Iowa	....	....	....	....	....	....	....	....	....	....	172	16
Missouri	....	....	....	....	607	3,011	347	10,222	569	25,091	1,574	58,240
Total	59,466	697,897	108,395	893,041	186,446	1,191,364	233,504	1,538,125	319,599	2,009,043	386,303	2,487,455

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* The 13 original states of the Union. The years given are those in which they each ratified the federal constitution.

TABLE III.—POPULATION, DISTINGUISHED BY COLOR, CONDITION, AND SEX, 1850 AND 1860.*

States and Territories.	Whites.†						Free colored.			
	Males.		Females.		Total.		Males.		Females.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	296,745	316,530	285,068	310,422	581,813	626,952	726	659	630	668
New Hampshire	155,960	159,963	161,496	166,016	317,456	325,579	260	253	260	241
Vermont	159,658	158,415	153,744	155,974	313,402	314,389	375	371	343	338
Massachusetts	484,093	592,244	501,357	629,220	985,450	1,221,464	4,424	4,469	4,640	5,133
Rhode Island	70,340	82,302	73,535	88,366	143,875	170,668	1,738	1,831	1,932	2,121
Connecticut	179,884	221,658	183,215	229,662	363,099	451,520	3,820	4,136	3,873	4,491
New York	1,544,489	1,910,854	1,503,836	1,921,876	3,048,325	3,831,730	23,452	23,178	25,617	25,827
New Jersey	233,452	322,783	232,057	323,966	465,509	646,699	11,798	12,312	12,012	13,006
Pennsylvania	1,142,734	1,427,946	1,115,426	1,421,320	2,258,160	2,849,266	25,369	26,373	28,257	30,476
Delaware	35,746	45,940	35,423	44,649	71,169	90,589	9,035	9,889	9,038	9,940
Maryland	211,187	256,839	206,756	259,079	417,943	515,918	35,192	39,746	39,531	44,196
Dist. of Columbia	18,494	29,585	19,447	31,179	37,941	60,764	4,248	4,702	5,811	6,429
Virginia	451,300	528,897	443,500	518,514	894,800	1,047,411	26,002	27,721	28,331	30,321
North Carolina	273,025	314,267	280,003	316,833	553,028	631,100	13,298	14,880	14,165	15,583
South Carolina	137,747	146,201	136,816	145,187	274,563	291,388	4,131	4,548	4,829	5,366
Georgia	266,233	301,083	255,339	290,505	521,572	591,588	1,375	1,669	1,556	1,831
Florida	25,705	41,129	21,498	36,619	47,203	77,748	418	454	514	478
Alabama	219,483	270,271	207,031	256,160	426,514	526,431	1,056	1,254	1,209	1,436
Mississippi	156,287	186,275	139,431	167,626	295,718	353,901	474	382	456	391
Louisiana	141,243	189,738	114,248	167,891	255,491	357,629	7,479	8,279	9,983	10,368
Texas	84,869	228,797	69,165	192,497	154,034	421,294	211	181	186	174
Arkansas	85,874	171,501	76,315	152,690	162,189	324,191	314	72	294	72
Tennessee	382,235	422,810	374,601	403,972	756,836	826,782	3,117	3,538	3,305	3,762
Kentucky	392,804	474,211	368,609	445,306	761,413	919,517	4,863	5,101	5,148	5,583
Ohio	1,004,117	1,171,720	950,933	1,131,118	1,955,050	2,302,838	12,691	18,398	12,588	18,266
Michigan	208,465	391,127	186,606	351,187	395,071	742,314	1,431	3,567	1,152	3,232
Indiana	506,178	693,469	470,976	645,581	977,154	1,339,000	5,715	5,791	5,547	5,637
Illinois	445,544	898,952	400,490	805,371	846,034	1,704,323	2,777	3,809	2,659	3,819
Wisconsin	164,351	406,796	140,405	367,914	304,756	774,710	365	653	270	518
Minnesota	3,695	93,931	2,343	79,665	6,038	173,596	21	126	18	133
Iowa	100,887	353,927	90,994	319,917	191,881	673,844	165	581	168	523
Missouri	312,987	563,144	279,017	500,365	592,004	1,063,509	1,361	1,697	1,257	1,875
Kansas	....	58,892	....	47,687	....	106,579	....	286	....	339
California	84,708	270,510	6,927	105,398	91,635	375,908	872	2,827	90	1,259
Oregon	8,138	31,515	4,949	20,822	13,087	52,337	120	76	87	52
Washington	....	8,420	....	3,144	....	11,564	....	26	....	4
Nevada	....	6,102	....	710	....	6,812	....	35	....	10
Utah	6,020	20,224	5,310	19,990	11,330	40,214	14	18	10	17
New Mexico	31,725	49,046	29,800	44,885	61,525	93,481	17	45	5	40
Colorado	....	32,654	....	1,577	....	34,231	....	37	....	9
Nebraska	....	16,719	....	12,040	....	28,759	....	35	....	32
Dacotah	....	2,797	....	2,040	....	4,837	....	....	....	....
Total	10,026,402	13,869,484	9,526,666	13,133,390	19,553,068	27,003,814	208,724	234,000	225,771	253,996

States and Territories.	Free colored.		Slaves.						Aggregate	
	Total.		Males.		Females.		Total.			
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	1,356	1,327	....	....	....	....	....	....	583,169	628,279
N. Hampshire	520	494	....	....	....	....	....	....	317,976	326,073
Vermont	718	709	....	....	....	....	....	....	314,120	315,098
Massachusetts	9,064	9,602	....	....	....	....	....	....	994,514	1,231,066
Rhode Island	3,670	3,952	....	....	....	....	....	....	147,545	174,620
Connecticut	7,693	8,627	....	....	....	....	....	....	370,792	460,147
New York	49,069	49,005	....	....	....	....	....	....	3,097,394	3,880,735
New Jersey	23,810	25,318	96	6	140	12	236	18	489,555	672,035
Pennsylvania	53,626	56,849	....	....	....	....	....	....	2,311,786	2,906,115
Delaware	18,073	19,829	1,174	860	1,116	938	2,290	1,798	91,532	112,216
Maryland	74,723	83,942	45,944	44,313	44,424	42,876	90,368	87,189	583,034	687,049
Dist. Columbia	10,059	11,131	1,422	1,212	2,265	1,973	3,687	3,185	51,687	75,080
Virginia	54,333	58,042	240,562	249,483	231,966	241,382	472,528	490,865	1,421,661	1,596,318
North Carolina	27,463	30,463	144,581	166,469	143 967	164,590	288,548	331,059	869,039	992,622
South Carolina	8,960	9,914	187,756	196,571	197,228	205,835	384,984	402,406	668,507	703,708
Georgia	2,931	3,500	188,857	229,193	192,825	233,005	381,682	462,198	906,185	1,057,286
Florida	932	932	19,804	31,348	19,506	30,397	39,310	61,745	87,445	140,425
Alabama	2,265	2,690	171,804	217,766	171,040	217,314	342,844	435,080	771,623	964,201
Mississippi	930	773	154,674	219,301	154,626	217,330	309,878	436,631	606,526	791,305
Louisiana	17,462	18,647	125,874	171,977	118,935	159,749	244,809	331,726	517,762	708,002
Texas	397	355	28,700	91,189	29,461	91,377	58,161	182,566	212,592	604,215
Arkansas	608	144	23,658	56,174	23,442	54,941	47,100	111,115	209,897	435,450
Tennessee	6,422	7,300	118,780	136,370	120,679	139,349	239,459	275,719	1,002,717	1,109,801
Kentucky	10,011	10,684	105,063	113,009	105,918	112,474	210,981	225,483	982,405	1,155,684
Ohio	25,279	36,664	....	....	....	....	....	....	1,980,329	2,339,502

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* The census returns for 1860 are not yet (July, 1862) officially published. The following table embodies the latest revision, and the numbers consequently vary to some extent from those given in previous articles.

† Including taxed Indians and Chinese as follows: Maine, 5; Vermont, 20; Massachusetts, 32; Rhode Island, 19; Connecticut, 16; New York, 140; Pennsylvania, 7; Virginia, 112; North Carolina, 1,158; South Carolina, 88; Georgia, 38; Florida, 1; Alabama, 160; Mississippi, 2; Louisiana, 173; Texas, 403; Arkansas, 48; Tennessee, 60; Kentucky, 33; Ohio, 30; Michigan, 2,515; Indiana, 290; Illinois, 32; Wisconsin, 1,017; Minnesota, 2,369; Iowa, 65; Missouri, 20; Kansas, 189; California, 37,903 (including 23,140 Chinese); Oregon, 177; Washington, 426; Utah, 89; New Mexico, 10,507; Nebraska, 63; Dacotah, 2,261; District of Columbia, 1; total, 60,469, of whom 37,329 were Indians and 23,140 Chinese, and 42,078 males and 18,391 (7,249 of both races in California) females.

TABLE III.—POPULATION DISTINGUISHED BY COLOR, CONDITION, AND SEX, 1850 AND 1860.—*Continued.*

States and Territories.	Free colored.		Slaves.						Aggregate.	
	Total.		Males.		Females.		Total.			
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Michigan......	2,583	6,799	....	....	....	...	....	....	397,654	749,113
Indiana........	11,262	11,428	....	....	....	....	....	....	988,416	1,350,428
Illinois	5,436	7,628	....	....	....	....	....	....	851,470	1,711,951
Wisconsin.....	685	1,171	....	....	....	....	....	....	305,391	775,881
Minnesota.....	39	259	....	....	....	....	....	....	6,077	173,855
Iowa...........	333	1,104	....	....	....	....	....	....	192,214	674,948
Missouri.......	2,618	3,572	43,484	57,360	43,938	57,571	87,422	114,931	682,044	1,182,012
Kansas	....	625	....	....	....	2	....	2	....	107,206
California	962	4,086	....	....	....	....	....	....	92,597	379,994
Oregon	207	128	....	....	....	....	....	....	13,294	52,465
Washington...	....	30	....	....	....	....	....	....	1,201	11,594
Nevada	....	45	....	....	....	....	....	....	....	6,857
Utah..........	....	30	12	18	14	11	26	29	11,380	40,273
New Mexico ..	....	85	....	....	....	....	....	....	61,547	93,516
Colorado......	....	46	....	....	....	....	....	....	....	34,277
Nebraska	....	67	....	6	....	9	....	15	....	28,841
Dacotah.......	....	....	....	....	....	....	....	....	....	4,837
Total.......	434,449	487,996	1,602,245	1,982,625	1,601,490	1,971,135	3,204,313	3,953,760	23,191,876	31,445,080

TABLE IV.—DEAF AND DUMB, BLIND, INSANE, AND IDIOTIC, 1850 AND 1860.*

States and Territories.	Deaf and Dumb.				Blind.				Insane.				Idiotic.			
	1850.		1860.		1850.		1860.		1850.		1860.		1850.		1860.	
	Free.	Slave.	Free.	Slave.	Free.	Slave.	Free.	Slave.	Free.	Slave.	Free.	Slave.	Free.	Slave.	Free.	Slave.
Maine	266	..	354	..	198	..	238	..	561	..	704	..	577	..	658	..
N. Hampshire	162	..	212	..	184	..	142	..	878	..	506	..	351	..	336	..
Vermont	148	..	180	..	140	..	165	..	560	..	698	..	299	..	263	..
Massachusetts	358	..	512	..	463	..	498	..	1,680	..	2,105	..	791	..	712	..
Rhode Island	65	..	62	..	67	..	85	..	217	..	288	..	114	..	101	..
Connecticut .	404	..	478	..	186	..	152	..	470	..	281	..	287	..	226	..
New York ...	1,263	..	2,077	..	1,181	..	1,768	..	2,521	..	4,317	..	1,665	..	2,314	..
New Jersey .	189	..	282	..	207	..	208	..	379	..	589	..	419	..	365	..
Pennsylvania	1,145	..	1,587	..	969	..	1,187	..	1,914	..	2,766	..	1,467	..	1,842	..
Delaware	52	2	57	1	89	..	42	..	68	..	60	..	88	4	67	..
Maryland	235	36	246	85	278	45	264	84	521	25	546	14	323	68	243	62
Dist. Col'bia .	19	..	54	1	23	1	47	..	22	1	204	..	18	..	27	..
Virginia	558	89	768	121	582	299	557	232	911	59	1,121	58	981	201	1,065	214
N. Carolina ..	396	75	440	106	406	155	392	189	477	33	597	63	643	151	739	241
S. Carolina...	136	29	170	59	164	184	171	120	228	21	299	18	254	94	232	121
Georgia	209	57	345	83	228	129	297	188	296	28	447	44	516	148	541	183
Florida	18	11	18	9	16	14	15	21	9	2	20	5	23	8	52	16
Alabama.....	152	58	235	67	158	188	204	114	203	30	225	82	343	183	403	134
Mississippi ...	80	27	164	55	112	98	147	116	105	24	236	86	188	64	193	78
Louisiana	85	32	215	38	92	122	112	118	82	45	182	37	112	62	143	104
Texas	49	10	180	24	62	11	119	31	37	..	112	18	93	11	164	37
Arkansas	80	4	127	15	79	18	118	26	60	8	82	5	105	10	152	34
Tennessee ...	336	41	422	73	392	82	437	117	385	22	612	28	761	85	732	149
Kentucky ...	512	51	641	75	439	113	580	144	504	23	590	33	816	91	903	155
Ohio	915	..	1,171	..	642	..	899	..	1,817	..	2,293	..	1,361	..	1,733	..
Michigan	125	..	335	..	125	..	254	..	183	..	251	..	189	..	336	..
Indiana	537	..	691	..	353	..	580	..	563	..	1,085	..	938	..	907	..
Illinois	356	..	801	..	264	..	476	..	238	..	688	..	868	..	588	..
Wisconsin ...	69	..	378	..	63	..	220	..	54	..	288	..	94	..	257	..
Minnesota ...	..	..	33	..	..	..	23	..	1	..	25	..	1	..	31	..
Iowa	59	..	282	..	50	..	192	..	42	..	201	..	94	..	289	..
Missouri	263	19	520	46	194	38	338	60	251	11	750	20	325	32	447	63
Kansas.......	..	..	30	..	..	..	10	..	..	..	10	..	..	..	17	..
California....	7	..	68	..	1	..	68	..	2	..	456	..	7	..	42	..
Oregon	..	..	16	..	..	..	9	..	5	..	28	..	4	..	15	..
Washington..	..	..	9	..	..	..	2	..	..	..	3	..	..	..	..	..
Utah	..	..	14	..	2	..	17	..	5	..	15	..	1	..	5	..
New Mexico.	34	..	85	..	98	..	149	..	11	..	28	..	44	..	40	..
Nebraska.....	..	..	15	..	..	..	3	..	..	..	5	..	..	..	3	..
Dacotah	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Total......	9,272 581	581	14,269 808	808	8,407 1,387	1,387	11,125 1,510	1,510	15,283 327	327	23,593 406	406	14,605 1,182	1,182	17,286 1,579	1,579
Aggregate..	9,803		15,077		9,794		12,635		15,610		23,999		15,787		18,865	

* Of the free colored population in 1850, there were 136 deaf and dumb, 429 blind, 311 insane, and 348 idiotic.

Table V.—Decennial Increase per cent. of Population by Classes.

States and Territories	Increase per cent. of total population.							Increase per cent. of white population.						
	1800.	1810.	1820.	1830.	1840.	1850.	1860.	1800.	1810.	1820.	1830.	1840.	1850.	1860.
Maine	57.16	50.74	30.45	33.89	25.62	16.22	7.73	57.18	50.91	30.56	33.94	25.65	16.26	7.78
New Hampshire	29.50	16.65	13.90	10.31	5.66	11.74	2.55	29.61	16.67	13.98	10.47	5.69	11.76	2.57
Vermont	80.84	40.95	8.29	19.04	4.02	7.59	.32	80.76	40.96	8.24	19.12	4.09	7.61	.36
Massachusetts	11.76	11.53	10.86	16.65	20.85	34.81	23.79	11.66	11.63	10.98	16.83	20.82	35.17	23.96
Rhode Island	.02	11.44	7.83	17.02	11.95	35.57	18.35	1.15	12.03	8.31	17.89	12.78	36.26	18.65
Connecticut	5.40	4.40	5.02	8.17	4.13	19.62	24.10	5.21	4.31	4.65	8.40	4.23	.28	24.37
New York	72.51	63.45	43.14	39.76	26.60	27.52	25.31	77.00	65.22	45.06	40.58	26.96	28.14	25.69
New Jersey	15.10	15.86	13.04	15.58	16.36	31.14	37.27	14.81	16.26	13.46	16.64	17.09	32.40	39.00
Pennsylvania	38.67	34.49	29.55	28.47	27.87	34.09	25.71	38.19	34.24	29.26	28.78	27.95	34.72	26.20
Delaware	8.76	13.07	.10	5.50	1.74	17.22	22.60	7.64	11.05	*.14	4.19	1.66	21.52	27.44
Maryland	6.82	11.42	7.04	9.74	5.14	24.04	17.84	3.67	8.68	10.67	11.86	9.30	31.34	23.49
District of Columbia	..	70.46	37.58	20.57	9.74	18.24	45.25	..	59.73	40.64	21.88	11.22	23.75	60.22
Virginia	17.63	10.73	9.31	13.71	2.34	14.60	12.27	16.32	7.24	9.34	15.12	6.70	20.77	17.08
North Carolina	21.42	16.19	15.00	15.52	2.09	15.35	14.23	17.19	11.44	11.36	12.79	2.54	14.05	14.19
South Carolina	38.75	20.12	21.11	15.60	2.27	12.47	5.28	40.00	9.14	10.85	8.60	.47	5.97	6.21
Georgia	96.37	55.73	35.08	51.57	33.78	31.07	16.68	92.25	43.01	30.36	56.57	37.36	27.93	13.43
Florida	..	..	..	..	56.86	60.52	60.60	..	..	..	..	51.98	68.92	64.77
Alabama	..	..	..	112.91	221.09	115.12	24.97	..	..	..	122.82	76.03	27.24	23.45
Mississippi	..	335.95	86.97	81.08	174.96	61.46	30.48	..	344.56	83.18	67.02	154.21	65.13	19.70
Louisiana	..	..	100.39	40.63	63.35	46.92	30.99	..	..	113.87	21.88	77.16	61.23	39.98
Texas	..	..	..	..	..	..	183.37	..	..	..	..	..	..	173.58
Arkansas	..	..	..	112.91	90.86	30.62	107.45	..	..	..	104.07	200.62	110.16	99.88
Tennessee	195.05	147.84	61.55	61.28	21.60	20.92	10.68	186.47	135.39	57.46	57.60	19.57	18.13	9.25
Kentucky	202.36	83.98	38.82	21.90	13.36	25.98	17.64	194.22	80.26	34.05	19.12	13.99	28.99	20.84
Ohio	..	408.67	151.96	61.31	62.01	30.33	18.14	..	408.26	151.93	61.00	61.80	30.15	17.82
Michigan	..	..	86.81	255.65	570.90	87.34	88.38	..	..	86.03	264.87	574.91	86.74	87.89
Indiana	..	402.97	500.24	133.07	99.94	44.11	36.68	..	421.95	510.12	132.85	99.97	43.97	37.14
Illinois	..	..	349.53	185.17	202.44	78.81	101.04	..	..	367.68	188.28	204.56	79.14	101.49
Wisconsin	..	..	..	..	..	86.88	154.06	..	..	..	..	..	891.10	154.10
Minnesota	..	..	..	..	..	..	2,730.70	..	..	..	..	..	..	2,745.19
Iowa	..	..	..	..	..	45.85	251.14	..	..	..	..	..	347.02	251.22
Missouri	..	..	219.43	110.94	173.18	77.75	73.35	..	..	225.00	105.08	182.14	82.78	79.79
California	..	..	..	..	..	..	310.40	..	..	..	..	..	..	310.54
Oregon	..	..	..	..	..	..	294.64	..	..	..	..	..	...	299.96
Utah	..	..	..	..	..	..	254.07	..	..	..	..	..	..	254.88
New Mexico	..	..	..	..	..	..	51.98	..	..	..	..	..	..	51.83
Total	35.02	36.45	33.13	33.49	32.67	35.87	35.58	35.68	36.18	34.11	34.03	34.72	37.74	38.12

States and Territories.	Increase per cent. of free colored population.							Increase per cent. of slave population.						
	1800.	1810.	1820.	1830	1840.	1850.	1860.	1800.	1810.	1820.	1830.	1840.	1850.	1860.
Maine	52.04	18.45	*4.12	28.09	13.86	*.07	*11.87	..	..	..	..	..	..	..
New Hampshire	35.87	13.31	*18.96	*23.15	*11.09	*3.16	*13.46	*94.93	..	..	..	*66.66	..	..
Vermont	118.43	34.64	20.40	*2.43	*17.13	*1.64	*18.94	..	..	..	..	..	..	..
Massachusetts	18.10	4.41	.04	4.56	22.99	4.55	4.30	..	..	..	..	..	..	..
Rhode Island	*4.75	9.23	*1.52	.19	*9.07	13.34	6.76	*59.97	*71.65	*55.55	*64.58	*70.58	..	..
Connecticut	90.28	21.06	21.55	2.58	.72	*5.08	11.04	*65.53	*67.40	*68.70	*74.22	*32.00	..	..
New York	122.90	144.19	15.57	53.24	11.49	*1.91	*.13	*4.60	*26.18	*32.82	*99.25	*94.66	..	..
New Jersey	59.37	78.16	58.86	46.89	14.97	13.14	4.77	8.74	*12.64	*30.35	*70.17	*70.09	*64.98	..
Pennsylvania	122.74	54.46	34.27	25.58	26.16	12.06	5.12	*54.34	*53.39	*73.45	*90.99	*84.11	..	..
Delaware	112.05	58.87	*1.35	22.35	6.71	6.82	9.13	*30.76	*32.11	7.94	*26.99	*20.86	*12.09	*21.48
Maryland	143.52	73.21	17.10	33.24	17.26	20.36	12.04	2.52	5.55	*3.68	*4.09	*12.87	.70	*3.52
District of Columbia	..	225.54	58.80	51.97	35.90	20.30	10.41	..	66.30	18.20	*4.04	*23.28	*21.45	*13.72
Virginia	57.63	59.90	20.67	28.35	5.28	8.98	5.97	17.84	13.51	8.31	10.49	4.40	5.21	3.88
North Carolina	41.56	45.76	42.33	33.74	16.31	20.81	9.59	32.53	26.65	21.43	19.79	.08	17.38	14.74
South Carolina	76.84	42.98	49.89	16.04	4.48	8.26	7.68	36.46	34.35	31.62	22.02	3.68	17.71	4.56
Georgia	156.03	76.74	*2.10	41.00	10.74	6.46	18.01	102.99	77.12	42.23	45.35	29.15	35.85	21.10
Florida	..	..	..	..	*3.19	14.07	*2.58	..	..	..	..	65.90	52.85	57.09
Alabama	..	..	..	175.30	29.70	11.08	16.11	..	..	..	180.68	115.68	35.22	26.92
Mississippi	..	31.86	90.83	13.31	163.19	*31.91	*21.40	..	389.76	92.02	100.09	197.31	58.74	40.93
Louisiana	..	..	38.11	59.50	52.61	*31.52	6.73	..	..	99.26	58.67	53.71	45.32	36.03
Texas	..	..	..	..	..	..	*14.61	..	..	..	..	..	..	210.66
Arkansas	..	..	..	138.98	229.78	30.75	*77.47	..	..	..	182.99	335.64	136.26	135.89
Tennessee	*14.40	326.21	107.06	67.03	21.27	16.25	12.66	297.54	227.84	79.87	76.76	29.27	30.80	15.17
Kentucky	550.00	131.17	61.06	78.21	48.81	36.81	1.35	241.02	99.69	57.31	30.36	10.31	15.75	6.87
Ohio	..	463.50	148.70	102.58	81.25	45.76	43.30	..	..	..	..	*50.00	..	..
Michigan	..	..	45.00	50.00	170.88	265.34	164.15	..	..	..	..	..	..	..
Indiana	..	141.10	212.97	195.04	97.43	57.55	*3.49	..	75.55	*19.83	*98.42	..	..	..
Illinois	..	..	*25.44	258.20	119.79	51.08	30.04	..	..	445.83	*18.53	*55.68	..	..
Wisconsin	..	..	..	..	..	243.24	133.22	..	..	..	..	..	..	..
Minnesota	..	..	..	..	..	..	207.21	..	..	..	..	..	..	..
Iowa	..	..	..	..	..	93.60	487.18	..	..	..	..	..	..	..
Missouri	..	..	*42.83	63.97	172.62	66.32	13.94	..	..	239.48	145.46	132.11	50.10	81.51
California	..	..	..	..	..	..	296.67	..	..	..	..	..	..	..
Oregon	..	..	..	..	..	..	*41.54	..	..	..	..	..	..	..
Utah	..	..	..	..	..	..	..	..	..	..	..	..	..	11.53
New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	82.28	72.00	25.23	36.87	20.87	12.46	10.97	27.97	33.40	28.79	30.61	23.81	28.82	23.38

* Decrease.

Table VI.—Nativities of the White and Free Colored Population of the United States, 1850.

States and Territories.	Born in the state.	Born in other states.	Total native.	England.	Ireland.	Scotland.	Wales.	Germany.	France.	Spain.	Portugal.	Belgium.	Holland.	Turkey.	Italy.	Austria.	Switzerland.
Me. ...	517,117	34,012	551,129	1,949	13,871	532	60	290	143	18	58	2	12	4	20	8	11
N. H..	261,591	42,636	304,227	1,469	8,811	467	11	147	69	8	8	..	1	..	..	1	9
Vt.	232,086	48,880	280,966	1,546	15,377	1,045	57	218	40	8	5	..	2	..	7	..	2
Mass. ..	695,236	134,830	830,066	16,685	115,917	4,469	214	4,319	805	178	290	86	138	14	196	10	72
R. I....	102,641	21,658	124,299	4,490	15,944	988	12	230	80	14	56	2	12	1	25	1	8
Conn..	292,653	39,872	332,525	5,091	26,689	1,916	111	1,671	821	12	74	2	19	2	16	20	55
N. Y...	2,151,196	288,100	2,439,296	84,820	343,111	23,418	7,582	118,398	12,515	461	194	401	2,917	12	833	168	1,850
N. J...	385,429	45,012	430,441	11,877	31,092	2,263	166	10,686	942	23	16	43	857	..	30	20	204
Penn..	1,844,672	169,947	2,014,619	38,048	151,723	7,292	8,920	78,592	4,083	101	84	126	257	2	172	49	914
Del....	72,351	11,617	83,968	952	3,513	155	17	343	78	1	..	1	5	..	..	..	22
Md. ...	400,594	38,322	438,916	3,467	19,557	1,093	260	26,936	507	18	29	5	106	11	82	16	68
D. C...	24,967	17,989	42,956	682	2,373	142	20	1,404	80	20	6	14	4	..	74	8	36
Va.....	873,923	52,231	926,154	2,998	11,643	947	178	5,511	821	29	51	7	65	..	65	15	88
N. C...	556,248	21,502	577,750	394	567	1,012	7	344	43	4	12	1	4	..	4	2	8
S. C...	262,160	12,658	274,818	921	4,051	651	10	2,180	274	30	14	..	9	..	59	11	19
Ga.....	402,666	115,413	518,079	679	3,202	367	18	947	177	13	5	41	11	1	33	13	38
Fla.....	20,563	24,757	45,320	300	878	182	11	307	67	70	17	4	8	..	40	8	7
Ala.....	237,542	182,490	420,032	941	3,639	584	67	1,068	503	168	39	4	1	1	90	33	112
Miss. ..	140,885	150,229	291,114	593	1,928	317	10	1,064	440	49	2	3	8	..	121	16	41
La.....	145,474	60,447	205,921	3,550	24,266	1,196	48	17,507	11,552	1,417	157	115	112	48	915	156	723
Texas .	49,160	87,893	137,053	1,002	1,403	261	17	8,191	647	62	5	8	14	..	41	11	184
Ark....	63,206	97,139	160,345	196	514	71	11	516	77	3	8	2	2	..	15	..	12
Tenn. .	585,084	170,571	755,655	706	2,640	327	17	1,168	245	3	2	4	57	..	59	10	206
Ky. ...	601,764	139,117	740,881	2,805	9,466	683	171	13,607	1,116	21	5	27	88	..	143	12	279
Ohio ..	1,219,432	538,124	1,757,556	25,660	51,562	5,232	5,849	111,257	7,875	28	7	108	348	1	174	22	3,291
Mich...	140,648	200,943	341,591	10,620	13,430	2,861	127	10,070	945	10	2	112	2,542	2	12	21	118
Ind....	541,079	390,313	931,392	5,550	12,787	1,341	169	28,584	2,279	8	6	86	43	..	6	17	724
Ill.....	343,618	393,313	736,931	18,628	27,786	4,661	572	38,160	3,396	70	42	33	220	..	43	65	1,635
Wis....	63,015	134,897	197,912	18,952	21,043	3,527	4,319	34,519	775	4	4	45	1,157	..	9	61	1,244
Iowa ..	50,380	120,240	170,620	3,785	4,885	712	352	7,152	382	1	8	4	1,108	..	1	13	175
Mo. ...	277,604	243,222	520,826	5,879	14,734	1,049	176	44,352	2,138	46	11	58	189	7	124	71	964
Cal. ...	6,602	63,008	69,610	3,050	2,452	838	182	2,926	1,546	220	109	12	63	..	228	87	177
Minn. .	1,334	2,673	4,007	84	271	39	2	141	29	1	..	1	16	..	1	1	22
N.M.T.	58,421	840	59,261	43	292	29	1	215	26	8	1	..	2	..	1	..	11
Utah ..	1,381	7,974	9,355	1,056	106	232	125	50	18	1	..	..	..	..	1	3	1
Oregon	3,175	8,817	11,992	207	196	106	9	155	45	..	..	11	1	..	5	..	8
Total	13,624,897	4,112,681	17,737,578	278,675	961,719	70,550	29,868	573,225	54,069	3,113	1,274	1,313	9,848	106	3,645	946	13,358

States and Territories.	Russia.	Norway.	Denmark.	Sweden.	Prussia.	Sardinia.	Greece.	China.	Asia.	Africa.	British America.	Mexico.	Central America.	South America.	West Indies.	Sandwich Islands.	Other countries.	Total foreign.	Unknown.	Aggregate.
Me. ...	2	12	47	55	27	..	..	3	5	5	14,181	2	..	81	61	1	51	31,456	584	583,169
N. H..	..	2	3	12	2	..	..	..	4	3	2,501	5	..	11	17	3	7	13,571	178	317,976
Vt.....	1	8	..	..	6	..	..	..	7	..	14,470	..	..	3	6	4	23	32,831	323	314,120
Mass...	38	69	181	253	98	1	23	2	31	27	15,862	32	7	84	308	39	466	160,909	3,539	994,514
R. I....	1	25	15	17	5	..	..	..	1	9	1,024	7	21	4	57	8	52	23,111	135	147,545
Conn. .	5	1	16	13	42	..	1	5	16	72	970	4	..	35	192	45	57	37,473	794	370,792
N. Y...	617	392	429	758	2,211	..	..	34	66	80	47,200	33	29	179	1,067	40	1,941	651,801	6,297	3,097,394
N. J...	22	4	28	34	57	1	4	4	10	17	581	23	2	27	265	..	66	58,364	538	489,333
Penn. .	189	27	97	138	413	..	7	1	42	40	2,500	42	4	38	666	3	861	294,871	2,296	2,311,786
Del....	1	..	1	2	28	..	..	..	..	10	21	3	..	3	25	..	85	5,211	63	89,242
Md.....	23	10	35	57	183	..	..	1	2	10	215	3	..	52	279	2	251	53,288	462	492,666
D. C...	2	..	6	5	11	..	..	1	4	2	82	9	..	5	15	..	17	4,967	77	48,000
Va.....	8	5	15	16	36	..	..	3	4	3	235	4	1	7	72	1	76	22,394	585	949,133
N. C...	8	..	6	9	19	..	..	2	..	2	80	2	4	8	37	..	5	2,524	217	580,491
S. C....	19	7	24	29	44	..	1	1	4	9	57	4	..	3	177	..	50	8,662	43	283,523
Ga.....	8	6	24	11	25	..	1	..	2	18	108	3	..	3	95	..	58	5,907	517	524,503
Fla....	2	17	21	33	17	..	..	..	8	23	97	6	..	3	599	..	87	2,757	58	48,135
Ala....	10	3	18	51	45	..	7	..	..	18	49	89	3	2	28	3	116	7,638	1,109	428,779
Miss. ..	9	8	24	14	71	..	..	..	2	6	79	18	1	4	25	..	110	4,958	576	296,648
La.....	65	64	288	249	880	9	23	33	17	90	499	405	3	15	1,337	1	1,178	66,413	619	272,953
Texas..	10	105	49	48	75	..	..	..	..	4	137	4,459	8	1	22	5	60	16,774	604	154,431
Ark....	6	1	7	1	24	..	..	..	..	1	41	68	..	..	7	..	50	1,628	824	162,797
Tenn. .	9	..	8	8	82	2	2	..	8	5	76	12	..	..	20	..	59	5,740	1,759	763,154
Ky. ...	70	18	7	20	198	1	1	..	8	4	275	42	1	2	41	..	183	29,189	1,354	771,424
Ohio ..	84	18	58	55	765	15	..	8	6	7	5,880	26	12	41	86	1	544	218,512	4,359	1,980,427
Mich...	25	110	18	16	190	2	1	1	..	8	14,008	4	..	5	84	2	66	54,852	1,211	397,654
Ind....	6	18	10	16	740	..	..	..	4	4	1,878	31	..	4	12	..	108	54,426	2,598	988,416
Ill.....	27	2,415	93	1,123	286	..	4	1	2	11	10,699	30	..	12	75	9	495	110,593	3,946	851,470
Wis....	71	8,651	146	88	3,545	1	1	..	17	1	8,277	9	11	6	20	1	191	106,695	784	305,391
Iowa..	41	361	19	231	88	..	1	..	2	..	1,756	16	..	1	14	..	124	21,232	362	192,214
Mo. ...	29	155	55	37	697	1	..	..	3	7	1,053	94	..	20	50	1	954	72,474	1,322	594,622
Cal....	48	124	92	162	158	1	9	660	117	65	834	6,454	39	877	64	319	400	22,358	629	92,597
Minn. .	2	7	1	4	5	..	..	..	..	..	1,417	..	..	..	..	..	4	2,048	22	6,077
N.M.T.	4	2	2	1	14	..	..	..	..	..	88	1,365	..	1	2	..	5	2,063	223	61,547
Utah..	1	32	2	1	6	..	..	1	..	..	838	7	..	..	2	..	12	1,990	9	11,354
Oregon	1	1	2	2	1	..	..	2	..	..	298	1	..	6	..	50	57	1,159	143	13,294
Total	1,414	12,678	1,838	3,559	10,549	34	86	758	377	551	147,711	13,317	141	1,543	5,772	588	8,214	2,210,839	39,154	19,987,571

TABLE VII.—CAPITALS OF THE STATES AND TERRITORIES, THEIR POPULATION TO THE SQUARE MILE, VALUATION OF REAL AND PERSONAL ESTATE, AND CONGRESSIONAL REPRESENTATION, IN 1850 AND 1860.

States and Territories.	Capitals.	Population to the square mile.		Valuation of real and personal estate.			Number of representatives.	
		1850.	1860.	1850.	1860.	Incr. per ct.	1850.	1860.
Maine	Augusta.	18.36	19.47	$122,777,571	$190,211,600	54.92	6	5
New Hampshire	Concord.	34.26	35.14	103,652,835	156,310,860	50.80	3	3
Vermont	Montpelier.	34.69	34.79	92,205,049	122,477,170	32.83	3	2
Massachusetts	Boston.	127.50	157.85	573,342,286	815,237,433	42.19	11	10
Rhode Island	Providence.*	141.06	166.94	80,508,794	135,337,588	68.10	2	1
Connecticut	Hartford.†	78.89	97.29	155,707,980	444,274,114	185.32	4	4
New York	Albany.	65.90	76.83	1,080,309,216	1,843,338,517	70.63	33	31
New Jersey	Trenton.	58.84	80.71	§200,000,000	467,918,324	133.95	5	5
Pennsylvania	Harrisburg.	50.26	63.18	722,486,120	1,416,501,818	96.05	25	23
Delaware	Dover.	43.18	52.93	21,062,556	46,242,181	119.54	1	1
Maryland	Annapolis.	52.41	61.76	219,217,364	376,919,944	71.93	6	5
District of Columbia	Washington.	861.45	1,251.33	14,018,874	41,084,945	193.06	..	..
Virginia	Richmond.	23.17	26.02	430,701,082	793,249,681	84.17	13	11
North Carolina	Raleigh.	19.31	22.05	226,800,472	358,739,399	58.17	8	7
South Carolina	Columbia.	22.13	23.29	288,257,694	548,138,754	90.15	6	4
Georgia	Milledgeville.	15.62	18.23	335,425,714	645,895,237	92.56	8	7
Florida	Tallahassee.	1.48	2.37	22,862,270	73,101,500	219.74	1	1
Alabama	Montgomery.	15.21	19.01	228,204,332	495,237,078	117.01	7	6
Mississippi	Jackson.	12.86	16.78	228,951,130	607,324,911	165.26	5	5
Louisiana	Baton Rouge.	12.55	17.16	233,998,764	602,118,568	157.30	4	5
Texas	Austin.	0.89	2.54	52,740,473	365,200,614	592.44	2	4
Arkansas	Little Rock.	4.02	8.34	39,841,025	219,256,473	450.32	2	3
Tennessee	Nashville.	21.99	24.34	201,246,686	493,903,892	145.42	10	8
Kentucky	Frankfort.	26.07	30.69	301,628,456	666,043,112	120.81	10	8
Ohio	Columbus.	49.55	58.54	504,726,120	1,193,898,422	136.54	21	18
Michigan	Lansing.	7.07	13.32	59,787,255	257,163,983	330.13	4	6
Indiana	Indianapolis.	29.24	39.93	202,650,264	528,835,371	160.95	11	11
Illinois	Springfield.	15.37	30.89	156,265,006	871,860,282	457.93	9	13
Wisconsin	Madison.	5.66	14.39	42,056,595	273,671,668	550.72	3	6
Minnesota	St. Paul.	‡0.04	2.14	‖.......	52,294,413	....	..	1
Iowa	Des Moines.	3.77	13.35	23,714,638	247,338,265	942.97	2	5
Missouri	Jefferson City.	10.12	17.54	137,247,707	501,214,398	265.18	7	9
Kansas	Lecompton.	..	1.37	....	31,327,895	....	..	1
California	Sacramento City.	0.60	2.44	22,161,872	¶207,874,613	837.98	**2	3
Oregon	Salem.	‡0.07	0.66	5,063,474	28,930,637	471.85	..	1
Washington	Olympia.	..	0.07	....	5,601,466	....	..	..
Nevada	....	..	0.15	....	....	....	..	..
Utah	Fillmore City.	‡0.04	0.30	986,083	5,596,118	467.50	..	..
New Mexico	Sante Fé.	0.28	0.43	5,174,471	20,813,768	302.24	..	..
Colorado	Denver City.	..	0.32	....	....	....	..	..
Nebraska	Omaha City.	..	0.24	....	9,131,056	....	..	..
Dacotah	....	..	0.03	....	....	....	..	..
Total		8.23	11.16	$7,135,780,228	$16,159,616,068	126.45	234	233

TABLE VIII.—COMPARATIVE POPULATION OF CITIES AND TOWNS HAVING OVER 14,000 INHABITANTS IN 1860.

Cities and Towns.	States.	1850.	1860.	Cities and Towns.	States.	1850.	1860.
New York	N. Y.	515,547	814,287	Charlestown	Mass.	17,216	25,063
Philadelphia	Penn.	408,762	568,034	Worcester	Mass.	17,049	24,960
Brooklyn	N. Y.	130,757	266,664	Reading	Penn.	15,743	23,165
Baltimore	Md.	169,054	212,419	Memphis	Tenn.	8,851	22,625
Boston	Mass.	136,881	177,481	Utica	N. Y.	17,565	22,528
New Orleans	La.	119,461	168,823	New Bedford	Mass.	16,443	22,524
Cincinnati	Ohio	115,436	161,044	Savannah	Ga.	16,060	22,292
St. Louis	Mo.	77,860	151,780	Salem	Mass.	20,264	22,252
Chicago	Ill.	28,269	109,263	Wilmington	Del.	13,979	21,258
Buffalo	N. Y.	42,261	81,131	Dayton	Ohio	10,977	20,482
Newark	N. J.	38,894	72,179	Manchester	N. H.	13,932	20,107
Louisville	Ky.	43,194	69,740	Paterson	N. J.	11,334	19,618
Albany	N. Y.	50,763	62,368	Lynn	Mass.	14,257	19,083
Washington	D. C.	51,687	61,118	Indianapolis	Ind.	8,094	18,612
San Francisco	Cal.	34,870	56,805	Columbus	Ohio	17,882	18,555
Charleston	S. C.	42,985	51,210	Petersburg	Va.	14,010	18,275
Providence	R. I.	41,513	50,666	Lawrence	Mass.	8,282	17,639
Pittsburg	Penn.	46,601	49,220	Lancaster	Penn.	12,369	17,603
Rochester	N. Y.	36,403	48,096	Trenton	N. J.	6,461	17,221
Detroit	Mich.	34,436	45,619	Nashville	Tenn.	10,165	16,987
Milwaukee	Wis.	20,061	45,254	Oswego	N. Y.	12,205	16,817
New Haven	Conn.	20,345	39,277	Kingston	N. Y.	10,232	16,640
Troy	N. Y.	28,785	39,235	Covington	Ky.	9,408	16,471
Richmond	Va.	27,570	37,910	Bangor	Me.	14,432	16,407
Lowell	Mass.	33,383	36,827	Taunton	Mass.	10,441	15,376
Cleveland	Ohio	17,034	36,054	Springfield	Mass.	11,766	15,199
Mobile	Ala.	20,515	29,259	Newburg	N. Y.	11,415	15,198
Jersey City	N. J.	11,478	29,226	Norfolk	Va.	14,326	14,609
Hartford	Conn.	13,555	29,152	Poughkeepsie	N. Y.	13,944	14,726
Alleghany	Penn.	21,262	28,708	Peoria	Ill.	5,095	14,425
Syracuse	N. Y.	22,271	28,199	Camden	N. J.	9,479	14,358
Portland	Me.	20,815	26,342	Wheeling	Va.	11,391	14,183
Cambridge	Mass.	15,215	26,060	Norwich	Conn.	10,265	14,047
Roxbury	Mass.	18,364	25,137	Fall River	Mass.	11,524	14,027

* Sessions of the legislature held alternately in Providence and Newport. † Sessions of the legislature held alternately in Hartford and New Haven. ‡ Area diminished since 1850. § Partly estimated, the real estate only being returned. ‖ Not returned in full. ¶ Only 18 counties returned. ** An additional representative allowed by act of July 30, 1851.

Table IX.—Agricultural Statistics of the United States for the Years 1850 and 1860.

States and Territories.	Acres of improved land in farms.		Acres of unimproved land in farms.		Cash value of farms.		Cash value of implements and machinery.		Horses.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	2,039,596	2,677,216	2,515,797	3,023,539	$54,861,748	$78,690,725	$2,284,557	$3,298,327	41,721	60,638
New Hampshire	2,251,488	2,367,039	1,140,926	1,377,591	55,245,997	69,689,761	2,314,125	2,682,412	34,233	41,101
Vermont	2,601,409	2,758,443	1,524,413	1,402,396	63,367,227	91,511,673	2,739,282	3,554,728	61,057	67,250
Massachusetts	2,133,436	2,155,512	1,222,576	1,183,212	109,076,347	123,255,948	3,209,584	3,894,998	42,216	47,786
Rhode Island	356,487	329,884	197,451	189,814	17,070,802	19,385,578	497,201	587,241	6,168	7,121
Connecticut	1,768,178	1,830,808	615,701	673,457	72,726,422	90,830,005	1,892,541	2,339,481	26,879	33,276
New York	12,408,964	14,376,397	6,710,120	6,616,553	554,546,642	803,343,593	22,084,926	29,166,695	447,014	503,725
New Jersey	1,767,991	1,944,445	984,955	1,039,086	120,237,511	180,250,338	4,425,503	5,746,567	63,955	79,707
Pennsylvania	8,628,619	10,463,306	6,294,728	6,548,847	407,876,099	662,050,707	14,722,541	22,442,842	350,398	437,654
Delaware	580,862	637,065	375,282	367,230	18,880,031	31,426,357	510,279	817,883	13,852	16,562
Maryland	2,797,905	3,002,269	1,836,445	1,833,306	87,178,545	145,973,677	2,463,443	4,010,529	75,684	93,406
Dist. of Columbia	16,267	16,267	11,187	16,789	1,730,460	2,989,267	40,220	54,410	824	641
Virginia	10,360,135	11,435,954	15,792,176	19,578,946	216,401,543	371,696,211	7,021,772	9,381,008	272,403	287,522
North Carolina	5,453,975	6,517,284	15,543,008	17,245,685	67,891,766	143,301,065	3,931,532	5,873,942	148,693	150,661
South Carolina	4,072,651	4,572,060	12,145,049	11,623,860	82,431,684	139,652,508	4,136,354	6,151,657	97,171	81,125
Georgia	6,378,479	8,062,758	16,442,900	18,587,732	95,753,445	157,072,803	5,894,150	6,844,387	151,331	130,771
Florida	349,049	676,464	1,246,240	2,273,008	6,323,109	16,371,684	658,795	888,930	10,848	13,424
Alabama	4,435,614	6,462,987	7,702,067	12,687,913	64,323,224	172,176,168	5,125,663	7,287,599	128,001	127,365
Mississippi	3,444,358	5,150,008	7,046,061	11,703,556	54,738,634	186,866,914	5,762,927	8,664,816	115,460	117,134
Louisiana	1,590,025	2,734,901	3,399,018	6,765,879	75,814,398	215,565,421	11,576,938	20,391,883	89,514	79,068
Texas	643,976	2,649,207	10,852,363	20,486,990	16,550,008	104,007,689	2,151,704	6,114,362	76,760	320,621
Arkansas	781,530	1,933,036	1,816,684	7,609,938	15,265,245	91,673,403	1,601,296	4,024,114	60,197	101,249
Tennessee	5,175,173	6,897,974	13,808,849	13,457,960	97,851,212	272,555,054	5,360,210	8,371,095	270,636	290,548
Kentucky	5,968,270	7,644,217	10,981,478	11,519,059	155,021,262	291,496,955	5,169,037	7,474,573	315,682	355,704
Ohio	9,851,493	12,665,587	8,146,000	8,075,551	358,758,603	666,564,171	12,750,585	16,790,226	463,397	622,829
Michigan	1,929,110	3,419,861	2,454,780	3,511,581	51,872,446	163,279,087	2,891,371	5,855,642	58,506	154,168
Indiana	5,046,543	8,161,717	7,746,879	8,154,059	136,385,173	344,902,776	6,704,444	10,420,826	314,299	409,504
Illinois	5,039,545	13,251,473	6,997,867	7,993,557	96,133,290	432,531,072	6,405,561	18,276,160	267,653	575,161
Wisconsin	1,045,499	3,746,036	1,931,159	4,153,134	28,528,563	131,117,082	1,641,568	5,758,847	30,179	116,192
Minnesota	5,035	554,397	23,846	2,222,734	161,948	19,070,737	15,981	1,044,009	860	17,122
Iowa	824,682	3,780,253	1,911,382	5,649,136	16,657,567	118,741,405	1,172,869	5,190,042	38,536	174,957
Missouri	2,938,425	6,246,871	6,794,245	13,737,939	63,225,543	230,632,126	3,981,525	8,711,508	225,319	361,874
Kansas	....	372,835	....	1,284,626	....	11,394,184	....	675,836	..	18,882
California	32,454	2,430,882	3,861,531	6,533,858	3,874,041	46,571,994	103,483	2,443,297	21,719	160,895
Oregon	132,857	895,375	299,951	5,316,817	2,849,170	14,765,355	183,423	949,103	8,046	36,600
Washington	....	....	....	300,897	....	1,116,202	....	202,506	..	5,005
Utah	16,333	16,333	30,516	58,898	311,799	1,637,854	84,288	255,854	2,429	5,145
New Mexico	166,201	166,201	124,370	1,177,055	1,653,922	2,701,626	77,960	194,005	5,079	10,119
Nebraska	....	....	....	501,723	....	3,916,002	....	180,082	..	4,522
Dacotah	....	....	....	24,333	....	97,335	....	15,574	..	84

States and Territories.	Asses and Mules.		Milch cows.		Working oxen.		Other cattle.		Sheep.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	55	104	133,556	147,315	83,893	79,792	125,890	149,827	451,577	452,472
New Hampshire	19	10	94,277	94,880	59,027	51,512	114,606	118,075	384,756	310,534
Vermont	218	35	146,128	171,698	48,577	42,860	154,143	149,359	1,014,122	721,998
Massachusetts	34	108	130,099	144,492	46,611	38,221	83,284	97,201	188,651	114,829
Rhode Island	1	10	18,698	19,700	8,189	7,857	9,375	11,548	44,296	32,624
Connecticut	49	82	85,461	98,877	46,988	47,939	80,226	95,091	174,181	117,107
New York	963	1,553	931,324	1,123,634	178,909	121,702	767,406	727,837	3,453,241	2,617,855
New Jersey	4,089	6,362	118,736	138,818	12,070	10,067	80,455	89,909	160,488	135,228
Pennsylvania	2,259	8,832	530,224	673,547	61,527	60,371	562,195	685,575	1,822,357	1,631,540
Delaware	791	2,294	19,248	22,595	9,797	9,530	24,166	25,596	27,503	18,857
Maryland	5,644	9,829	86,856	99,463	34,135	34,524	98,595	119,254	177,902	155,765
Dist. of Columbia	57	122	813	639	104	69	123	198	150	40
Virginia	21,483	41,014	317,619	330,627	89,513	97,862	669,137	615,696	1,310,004	1,042,946
North Carolina	25,259	51,388	221,799	228,623	37,309	48,511	434,402	416,676	595,249	546,749
South Carolina	37,483	56,456	193,244	163,938	20,507	22,629	563,935	320,209	285,551	233,509
Georgia	57,379	101,069	334,223	299,688	73,286	74,487	690,019	631,707	560,435	512,618
Florida	5,002	10,909	72,876	92,704	5,794	7,787	182,415	284,736	23,311	29,958
Alabama	59,895	108,701	227,791	234,045	66,961	92,495	433,263	452,643	371,880	369,061
Mississippi	54,547	112,488	214,231	207,134	83,485	104,184	436,254	415,559	304,929	337,734
Louisiana	44,849	92,259	105,576	130,672	54,968	61,008	414,798	329,855	110,333	180,855
Texas	12,463	63,000	217,811	598,086	51,285	172,243	61,018	2,733,267	100,530	753,618
Arkansas	11,559	44,158	93,151	158,873	34,239	70,944	165,320	318,355	91,256	202,674
Tennessee	75,303	119,221	250,456	247,105	86,255	104,495	414,051	408,574	811,591	773,317
Kentucky	65,609	117,635	247,475	269,215	62,274	108,999	442,763	457,845	1,102,091	938,990
Ohio	3,423	6,917	544,499	696,309	65,381	61,760	749,067	901,781	3,942,929	3,063,887
Michigan	70	359	99,676	200,635	55,350	65,949	119,471	267,683	746,435	1,465,477
Indiana	6,599	18,627	284,554	491,033	40,221	95,982	389,891	582,990	1,122,493	2,157,375
Illinois	10,573	38,881	294,671	532,731	76,156	90,973	541,209	881,877	894,043	773,280
Wisconsin	156	1,019	64,339	193,996	42,801	93,660	76,293	225,210	124,896	332,454
Minnesota	14	395	607	40,386	655	27,574	740	51,043	80	13,123
Iowa	754	5,713	45,704	188,546	21,892	56,563	69,025	291,145	149,960	258,228
Missouri	41,667	80,941	230,169	345,243	112,168	166,588	449,173	657,153	762,511	937,445
Kansas	....	1,430	....	26,726	....	20,133	....	41,000	....	15,702
California	1,666	18,744	4,280	198,859	4,780	31,527	253,599	952,048	17,574	1,075,718
Oregon	420	990	9,427	53,072	8,114	7,426	24,188	93,001	15,382	75,986
Washington	....	178	....	10,034	....	2,777	....	16,072	....	10,162
Utah	325	973	4,861	13,052	5,266	9,903	2,489	17,369	3,262	37,888
New Mexico	8,654	11,255	10,635	84,461	12,257	26,104	10,085	29,228	377,271	836,429
Nebraska	....	473	....	7,125	....	12,720	....	8,870	....	1,737
Dacotah	....	19	....	286	....	848	....	838	....	22

TABLE IX.—AGRICULTURAL STATISTICS.—*Continued.*

States and Territories.	Swine.		Value of live stock.		Value of animals slaughtered.		Wheat, bushels.		Rye, bushels.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	54,598	54,783	$9,705,726	$15,437,533	$1,646,773	$2,780,179	296,259	233,877	102,916	123,290
New Hampshire	63,487	51,935	8,871,901	10,924,627	1,522,873	3,787,500	185,658	238,966	183,117	128,248
Vermont	66,296	49,433	12,643,228	15,884,393	1,861,336	2,549,001	535,955	431,127	176,233	130,976
Massachusetts	81,119	73,948	9,647,710	12,737,744	2,500,924	2,915,045	31,211	119,783	481,021	388,085
Rhode Island	19,509	17,478	1,532,637	2,042,044	667,486	713,725	49	1,131	26,409	28,259
Connecticut	76,472	75,120	7,467,490	11,311,079	2,202,266	3,181,992	41,762	52,401	600,893	618,702
New York	1,018,252	910,178	73,570,499	103,856,296	13,573,883	15,841,403	13,121,498	8,681,100	4,148,182	4,786,905
New Jersey	250,370	236,089	10,679,291	16,134,693	2,638,552	4,120,276	1,601,190	1,763,128	1,255,578	1,439,497
Pennsylvania	1,040,366	1,031,266	41,500,053	69,672,726	8,219,848	13,399,378	15,367,691	13,045,231	4,805,160	5,474,792
Delaware	56,261	47,848	1,849,281	3,144,706	373,665	573,075	482,511	912,941	8,066	27,209
Maryland	352,911	387,756	7,997,634	14,667,853	1,954,800	2,821,510	4,494,680	6,103,480	226,014	518,901
Dist. Columbia	1,635	1,099	71,643	109,640	9,038	55,440	17,370	12,760	5,509	6,939
Virginia	1,829,843	1,589,519	33,656,659	47,794,256	7,502,986	11,488,441	11,212,616	13,129,180	458,930	944,024
North Carolina	1,812,813	1,883,214	17,717,647	31,130,805	5,767,866	10,414,546	2,130,102	4,743,706	229,563	436,856
South Carolina	1,065,503	965,779	15,060,015	23,934,465	3,502,637	6,072,822	1,066,277	1,285,631	43,790	89,091
Georgia	2,168,617	2,036,116	25,728,416	38,372,734	6,339,762	10,908,204	1,088,534	2,544,913	53,750	115,532
Florida	209,453	274,814	2,880,058	5,480,789	514,685	1,201,441	1,027	2,808	1,152	21,314
Alabama	1,904,540	1,736,959	21,690,112	43,061,805	4,823,485	10,325,022	294,044	1,222,487	17,261	73,942
Mississippi	1,582,734	1,534,097	19,403,662	40,245,079	3,636,582	7,528,007	137,990	579,452	9,606	41,260
Louisiana	597,301	642,855	11,152,275	24,751,822	1,458,990	2,083,736	417	29,283	475	12,789
Texas	692,022	1,363,378	10,412,927	52,892,934	1,116,137	5,218,987	41,729	1,464,273	3,108	95,012
Arkansas	836,727	1,155,379	6,647,969	22,040,211	1,163,313	8,895,399	199,639	955,298	8,047	77,869
Tennessee	3,104,800	2,343,948	29,978,016	61,257,374	6,401,765	12,345,696	1,619,386	5,409,863	89,137	265,344
Kentucky	2,891,163	2,330,595	29,661,436	61,868,237	6,462,598	11,640,740	2,142,822	7,394,811	415,073	1,055,262
Ohio	1,964,770	2,175,623	44,121,741	80,433,780	7,439,243	14,293,972	14,487,351	14,532,570	425,918	656,146
Michigan	205,847	374,664	8,008,734	23,220,026	1,328,327	4,080,720	4,925,889	8,313,185	105,871	494,197
Indiana	2,263,776	2,498,528	22,478,555	50,116,964	6,567,935	9,592,322	6,214,458	15,219,120	78,792	400,226
Illinois	1,915,907	2,279,722	24,209,258	73,434,621	4,972,286	15,159,343	9,414,575	24,159,500	83,364	981,322
Wisconsin	159,276	333,957	4,897,385	17,807,366	920,178	3,368,710	4,286,131	15,812,625	81,253	888,534
Minnesota	734	101,252	92,859	3,655,366	2,840	782,418	1,401	2,195,812	125	124,259
Iowa	323,247	921,161	3,689,275	21,776,786	821,164	4,403,463	1,530,581	8,433,205	19,916	176,055
Missouri	1,702,625	2,354,425	19,887,580	53,693,673	3,367,106	9,844,449	2,981,652	4,227,586	44,268	293,262
Kansas	....	128,309	....	3,205,522	....	547,450	....	168,527	....	3,928
California	2,776	453,523	3,351,058	36,601,154	107,173	3,562,887	17,328	5,946,619	....	51,244
Oregon	30,235	79,660	1,876,189	6,272,892	164,530	640,196	211,943	822,408	106	2,714
Washington	....	9,836	....	1,147,681	....	105,108	....	92,609	....	244
Utah	914	10,780	546,968	1,729,012	67,985	268,752	107,702	382,697	210	872
New Mexico	7,314	9,489	1,494,629	4,386,084	82,125	309,168	196,516	446,075	....	1,300
Nebraska	....	25,965	....	1,216,328	....	100,755	....	72,268	....	1,185
Dacotah	....	287	....	39,116	....	375	....	945	....	700

States and Territories.	Indian corn, bushels.		Oats, bushels.		Rice, lbs.		Tobacco, lbs.		Ginned cotton, bales (400 lbs. each).	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	1,750,056	1,546,071	2,181,037	2,988,939	....	....	....	1,583	....	....
New Hampshire	1,573,670	1,414,628	973,381	1,329,213	....	....	50	21,281	....	....
Vermont	2,032,396	1,463,020	2,307,734	3,511,605	....	....	....	12,153	....	....
Massachusetts	2,345,490	2,157,063	1,165,146	1,180,075	....	....	138,246	3,233,198	....	....
Rhode Island	539,201	458,912	215,232	234,453	....	....	....	705	....	....
Connecticut	1,935,043	2,059,835	1,258,738	1,522,218	....	....	1,267,624	6,000,133	....	....
New York	17,858,400	20,061,048	26,552,814	35,175,133	....	1,120	83,189	5,764,582	....	....
New Jersey	8,759,704	9,723,336	3,378,063	4,539,132	....	....	310	149,485	....	....
Pennsylvania	19,835,214	28,196,821	21,538,156	27,387,149	....	....	912,651	3,181,586	....	....
Delaware	3,145,542	3,892,337	604,518	1,046,910	....	....	....	9,699	....	....
Maryland	10,749,858	13,444,922	2,242,151	3,959,298	....	....	21,407,497	38,410,965	....	....
Dist. of Columbia	65,230	80,840	8,134	29,548	....	....	7,800	15,200	....	....
Virginia	35,254,319	38,360,704	10,179,144	10,184,865	17,154	8,225	56,803,227	123,967,757	3,947	12,727
North Carolina	27,941,051	30,078,564	4,052,078	2,781,860	5,465,868	7,593,976	11,984,786	32,853,250	73,845	145,514
South Carolina	16,271,454	15,065,606	2,322,155	936,974	159,930,613	119,100,528	74,285	104,412	300,901	353,413
Georgia	30,080,099	30,776,293	3,820,044	1,231,817	38,950,691	52,507,652	423,924	919,316	499,091	701,840
Florida	1,996,809	2,824,538	66,586	46,779	1,075,090	223,209	998,614	758,015	45,131	66,063
Alabama	28,754,048	32,761,194	2,965,696	716,435	2,312,252	499,559	164,990	221,284	564,429	983,651
Mississippi	22,446,552	29,563,735	1,503,288	121,033	2,719,856	657,293	49,960	127,736	484,292	1,202,055
Louisiana	10,266,373	16,205,856	89,637	65,845	4,425,349	6,455,017	26,878	40,610	178,737	722,424
Texas	6,028,876	16,521,593	199,017	988,812	88,203	25,670	66,897	98,016	58,072	415,281
Arkansas	8,893,939	17,758,665	656,183	502,866	63,179	215	218,936	999,757	65,344	366,465
Tennessee	52,276,223	50,748,266	7,703,086	2,343,122	258,854	30,516	20,148,932	38,931,277	194,532	212,019
Kentucky	58,672,591	64,043,633	8,201,311	4,617,029	5,688	24,407	55,501,196	108,102,433	758	4,092
Ohio	59,078,695	70,637,140	13,472,742	15,479,133	....	....	10,454,449	25,528,972	....	....
Michigan	5,641,420	12,152,110	2,866,056	4,073,098	....	....	1,245	120,621	....	....
Indiana	52,964,363	69,641,591	5,655,014	5,028,755	....	1,219	1,044,620	7,246,132	14	....
Illinois	57,646,984	115,296,779	10,087,241	15,336,072	....	....	841,394	7,014,230	....	6
Wisconsin	1,988,979	7,565,290	3,414,672	11,059,270	....	....	1,268	87,595	....	....
Minnesota	16,725	2,987,570	30,582	2,202,050	....	....	....	33,510	....	....
Iowa	8,656,799	41,116,994	1,524,345	5,879,653	....	....	6,041	312,919	....	....
Missouri	36,214,537	72,892,157	5,278,079	3,680,870	700	9,767	17,113,784	25,086,196	....	101¼
Kansas	....	5,678,834	....	80,744	....	....	....	16,978	....	....
California	12,236	524,857	....	957,684	....	1,800	1,000	3,150	....	....
Oregon	2,918	74,566	61,214	900,204	....	....	325	215	....	....
Washington	....	4,792	....	158,001	....	....	....	10	....	....
Utah	9,899	93,861	10,900	188,036	....	....	70	10	....	1,183
New Mexico	365,411	710,605	5	7,491	....	....	8,467	6,999	....	....
Nebraska	....	1,846,785	....	79,977	....	....	....	3,801	....	....
Dacotah	....	20,296	....	2,540	....	....	....	....	....	....

TABLE IX.—AGRICULTURAL STATISTICS.—*Continued.*

States and Territories.	Wool, lbs.		Peas and beans, bushels.		Irish potatoes, bushels.		Sweet potatoes, bushels.		Barley, bushels.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	1,364,034	1,495,063	205,541	246,918	3,436,040	6,374,617	....	1,435	151,731	802,109
New Hampshire	1,108,476	1,160,212	70,856	79,455	4,304,919	4,137,543	....	161	70,256	121,103
Vermont	3,400,717	2,975,544	104,649	68,912	4,951,014	5,147,908	....	623	42,150	75,282
Massachusetts	585,136	377,267	43,709	45,246	3,585,384	3,201,901	....	616	112,385	134,891
Rhode Island	129,692	90,699	6,846	7,699	651,029	542,909	....	946	18,875	40,993
Connecticut	497,454	335,986	19,090	25,864	2,689,725	1,833,148	80	2,710	19,099	20,813
New York	10,071,301	9,454,473	741,546	1,609,334	15,398,368	26,447,389	5,629	7,523	3,585,059	4,186,667
New Jersey	375,396	349,250	14,174	27,675	3,207,236	4,171,690	508,015	1,034,832	6,492	24,915
Pennsylvania	4,481,570	4,752,523	55,231	123,094	5,980,732	11,687,468	52,172	103,190	165,584	530,716
Delaware	57,768	50,201	4,120	7,438	240,542	377,931	65,443	142,213	56	3,646
Maryland	477,438	491,511	12,816	34,407	764,939	1,264,429	208,993	23,744	745	17,350
Dist. of Columbia	525	100	7,754	3,749	28,292	31,733	3,497	4,191	75	175
Virginia	2,860,765	2,509,443	521,579	515,004	1,316,933	2,292,118	1,813,634	1,960,808	25,437	68,759
North Carolina	970,738	883,473	1,584,252	1,932,204	620,318	830,565	5,095,709	6,140,039	2,735	3,445
South Carolina	487,233	427,102	1,026,900	1,728,074	136,494	226,735	4,337,469	4,115,698	4,583	11,490
Georgia	990,019	946,229	1,142,011	1,765,214	227,379	316,552	6,986,428	6,508,541	11,501	14,682
Florida	23,247	58,594	135,359	364,738	7,828	18,549	757,226	1,213,493	....	15
Alabama	657,118	681,404	892,701	1,483,609	246,001	397,566	5,475,204	5,420,987	3,958	14,703
Mississippi	559,619	637,729	1,072,757	1,986,558	261,482	401,804	4,741,795	4,348,491	228	1,596
Louisiana	109,897	296,187	161,732	430,410	95,632	332,725	1,428,453	2,070,941	....	144
Texas	131,917	1,497,748	179,350	359,560	94,645	168,937	1,332,158	1,853,306	4,776	38,905
Arkansas	182,595	410,285	285,738	439,412	193,832	418,000	788,149	1,462,714	177	8,079
Tennessee	1,364,378	1,400,508	369,321	550,913	1,067,844	1,174,647	2,777,716	2,614,558	2,737	23,489
Kentucky	2,297,433	2,325,124	202,574	288,349	1,492,487	1,756,532	998,179	1,057,558	95,343	270,685
Ohio	10,196,371	10,648,161	60,168	105,219	5,057,769	8,752,873	187,991	297,908	354,358	1,601,082
Michigan	2,043,283	4,062,858	74,254	182,195	2,359,897	5,264,733	1,177	36,285	75,249	305,914
Indiana	2,610,287	2,466,264	35,773	77,701	2,083,337	3,873,130	201,711	284,304	45,483	296,374
Illinois	2,150,113	2,477,563	82,814	112,624	2,514,861	5,799,964	157,433	341,443	110,795	1,175,651
Wisconsin	253,963	1,011,915	20,657	99,804	1,402,077	3,848,505	879	2,345	209,692	678,992
Minnesota	85	22,740	10,002	18,802	276,120	2,027,945	200	781	1,216	125,130
Iowa	373,898	653,036	4,775	45,570	21,145	2,700,515	6,243	50,938	25,093	454,116
Missouri	1,627,164	2,069,778	46,017	107,999	939,006	1,990,850	335,505	335,102	9,631	228,502
Kansas	....	22,593	....	10,167	....	283,968	....	9,221	....	4,128
California	5,520	2,681,922	2,292	184,962	9,292	1,647,298	1,000	158,001	9,712	4,307,775
Oregon	29,686	208,943	6,566	34,616	91,326	311,700	....	335	....	26,463
Washington	....	20,720	....	38,005	....	191,354	....	18	....	1,715
Utah	9,222	75,638	289	3,135	43,968	140,370	60	....	1,799	12,283
New Mexico	32,901	479,245	15,688	38,584	3	5,354	....	180	5	6,099
Nebraska	....	3,312	....	4,508	....	169,762	....	163	....	1,243
Dacotah	....	....	....	286	....	9,489	....	....	....	....

States and Territories.	Buckwheat, bushels.		Value of orchard products.		Wine, gallons.		Value of market garden products.		Butter, lbs.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	104,523	339,520	$342,865	$501,767	724	3,165	$122,387	$194,006	9,243,811	11,687,781
New Hampshire	65,265	89,996	248,563	557,934	344	9,401	56,810	76,256	6,977,056	6,956,764
Vermont	209,819	215,821	315,255	198,427	659	2,923	18,853	24,792	12,137,980	15,681,834
Massachusetts	105,895	123,202	463,995	925,579	4,688	20,915	600,020	337,025	8,071,370	8,297,936
Rhode Island	1,245	3,573	63,994	83,691	1,013	507	98,298	146,661	995,670	1,014,856
Connecticut	229,297	309,107	175,118	508,848	4,269	46,783	196,874	1,397,623	6,498,119	7,620,912
New York	3,183,955	5,126,305	1,761,950	3,726,380	9,172	61,404	912,047	3,381,596	79,766,094	103,097,279
New Jersey	878,934	877,386	607,268	429,402	1,811	21,083	475,242	1,542,155	9,487,210	10,714,447
Pennsylvania	2,193,692	5,572,026	723,389	1,479,938	25,590	38,623	688,714	1,384,970	39,878,418	58,653,511
Delaware	8,615	16,355	46,574	114,225	145	683	12,714	37,797	1,055,308	1,430,502
Maryland	103,671	212,338	164,051	252,196	1,431	3,222	200,869	530,221	3,806,160	5,265,295
Dist. of Columbia	378	445	14,843	9,980	863	118	67,222	139,108	14,872	18,835
Virginia	214,898	477,808	177,137	800,650	5,480	40,508	183,047	589,411	11,089,359	13,461,712
North Carolina	16,704	35,924	34,348	643,688	11,058	54,064	39,462	75,663	4,146,290	4,735,495
South Carolina	283	602	35,108	213,989	5,880	24,964	47,286	187,348	2,981,850	3,177,934
Georgia	250	2,023	92,776	176,048	796	27,646	76,500	201,916	4,640,559	5,439,765
Florida	55	....	1,280	21,716	10	1,661	8,721	18,213	371,498	404,470
Alabama	348	1,334	15,408	213,323	220	19,130	84,821	135,181	4,008,811	6,125,708
Mississippi	1,121	1,740	50,405	259,380	407	10,106	46,250	124,608	4,346,234	5,111,135
Louisiana	3	160	22,359	110,923	15	5,030	148,329	390,742	683,069	1,440,943
Texas	59	1,612	12,505	46,802	99	13,946	12,354	55,943	2,344,900	5,948,611
Arkansas	175	488	40,141	56,230	35	1,005	17,150	38,094	1,854,239	4,062,481
Tennessee	19,427	14,421	52,894	314,269	92	13,562	97,183	274,163	8,139,585	10,000,828
Kentucky	16,097	18,929	106,230	604,851	8,093	179,949	303,120	458,246	9,947,523	11,716,609
Ohio	638,060	2,327,005	695,921	1,858,673	48,207	562,640	214,004	860,313	34,449,379	50,435,745
Michigan	472,917	600,435	132,650	1,137,678	1,654	13,733	14,738	145,058	7,065,878	14,650,834
Indiana	149,740	367,797	324,940	1,212,142	14,055	88,270	72,864	288,070	12,881,535	17,934,767
Illinois	184,504	345,069	446,049	1,145,936	2,997	47,093	127,494	418,195	12,526,543	28,337,516
Wisconsin	79,878	67,622	4,823	76,096	113	9,511	32,142	207,153	3,633,750	13,651,053
Minnesota	515	27,677	....	298	....	394	150	94,681	1,100	2,961,591
Iowa	52,516	216,524	8,434	131,234	420	3,706	8,848	141,549	2,171,188	11,526,003
Missouri	23,641	182,292	514,711	810,975	10,563	27,827	99,454	346,405	7,834,359	12,704,837
Kansas	....	36,799	....	724	....	241	....	36,353	....	1,012,975
California	....	36,486	17,700	607,459	58,055	494,516	75,275	1,074,143	705	3,338,590
Oregon	....	2,685	1,271	474,934	....	2,603	90,241	86,335	211,464	1,012,389
Washington	....	977	....	23,779	....	179	....	27,749	....	157,802
Utah	332	96	....	9,280	....	60	23,868	45,465	83,309	293,065
New Mexico	100	6	8,231	19,701	2,363	8,201	6,679	17,640	111	13,133
Nebraska	....	12,329	....	161	....	631	....	9,680	....	352,697
Dacotah	....	....	....	115	....	....	....	500	....	1,670

TABLE IX.—AGRICULTURAL STATISTICS.—*Continued.*

States and Territories.	Cheese, lbs.		Hay, tons.		Clover seed, bushels.		Other grass seeds, bushels.		Hops, lbs.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	2,434,454	1,799,862	755,889	975,716	9,097	48,851	9,214	6,807	40,120	102,987
New Hampshire	3,196,563	2,232,092	598,854	642,741	829	11,992	8,071	5,578	257,174	130,428
Vermont	8,720,834	8,077,689	‘66,153	919,066	760	2,444	14,936	11,420	288,023	631,641
Massachusetts	7,088,142	5,294,090	651,807	665,331	1,002	1,295	5,085	4,852	121,595	111,801
Rhode Island	316,508	177,252	74,818	82,725	1,328	1,221	3,708	4,229	277	50
Connecticut	5,363,277	3,898,411	516,131	562,425	13,841	13,671	16,628	13,024	554	959
New York	49,741,413	48,548,289	3,728,797	3,564,786	88,222	106,938	96,493	81,622	2,536,299	9,655,542
New Jersey	365,756	182,172	435,950	508,729	28,280	89,208	63,051	85,410	2,133	3,722
Pennsylvania	2,505,034	2,508,556	1,842,970	2,245,420	125,030	274,863	53,913	57,204	22,088	41,576
Delaware	3,187	6,579	30,159	36,978	2,525	8,595	1,403	1,165	348	414
Maryland	3,975	8,842	157,956	191,744	15,217	39,811	2,561	3,195	1,870	2,948
Dist. of Columbia	1,500	....	2,279	3,180	3	....	....	....	15	15
Virginia	436,292	280,792	369,098	445,529	29,727	36,961	23,428	58,068	11,506	10,015
North Carolina	95,921	51,119	145,653	181,365	576	332	1,275	3,008	9,246	1,767
South Carolina	4,970	1,543	20,925	87,592	376	23	30	88	26	122
Georgia	46,976	15,587	23,449	46,448	132	685	428	1,914	261	199
Florida	18,015	3,784	2,510	7,594	....	....	2	....	14	....
Alabama	31,412	9,607	32,685	55,219	138	187	547	653	276	1,069
Mississippi	21,191	3,419	12,504	32,385	84	217	533	1,175	473	221
Louisiana	1,957	5,494	25,752	46,999	2	....	97	701	125	8
Texas	95,299	277,512	8,354	11,349	10	449	....	2,976	7	123
Arkansas	30,088	16,952	3,976	8,276	90	60	436	3,110	157	164
Tennessee	177,681	126,794	74,091	146,027	5,096	8,062	9,118	41,532	1,032	2,329
Kentucky	213,954	190,400	113,747	158,484	3,230	2,808	21,481	62,563	4,309	5,899
Ohio	20,819,542	23,758,783	1,443,142	1,602,518	103,197	216,545	37,310	53,475	63,731	22,844
Michigan	1,011,492	2,009,064	404,934	756,908	16,989	49,480	9,285	6,555	10,663	61,704
Indiana	624,564	569,574	403,230	685,322	18,320	45,821	11,951	31,866	92,796	75,053
Illinois	1,278,225	1,595,858	601,952	1,834,265	3,427	16,687	14,380	202,808	3,551	7,129
Wisconsin	400,283	1,104,459	275,662	858,799	483	3,848	5,003	26,383	15,930	135,587
Minnesota	....	198,904	2,019	274,952	....	156	....	2,314	....	149
Iowa	209,840	901,220	89,055	707,260	342	1,564	2,096	69,432	8,242	1,797
Missouri	203,572	259,633	116,925	401,070	619	2,216	4,346	55,713	4,130	2,265
Kansas	....	28,058	....	50,812	....	98	....	2,633	....	130
California	150	1,564,857	2,038	306,741	....	4	....	162	....	10
Oregon	36,980	82,456	373	26,441	4	807	22	8,793	8	187
Washington	....	12,146	....	4,871	....	116	....	211	....	28
Utah	30,998	21,325	4,805	20,026	2	8	....	101	50	95
New Mexico	5,848	37,250	....	1,108	....	2	....	....	....	....
Nebraska	....	15,762	....	25,320	....	5	....	206	....	41
Dacotah	....	....	...	1,122	....	85	....	....	....	....

States and Territories.	Dew-rotted hemp, tons.		Water-rotted hemp, tons.		Other prepared hemp, tons.	Flax, lbs.		Flaxseed, bushels.		Silk cocoons, lbs.	
	1850.	1860.	1850.	1860.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	....	....	....	....	50	17,081	2,997	580	489	252	78
New Hampshire	....	18	...	50	18	7,652	1,847	189	81	191	1
Vermont	....	2	....	1	....	20,852	5,107	939	331	268	....
Massachusetts	....	....	....	....	....	1,162	165	72	7	7	....
Rhode Island	....	....	....	....	....	85	....	....	....	....	....
Connecticut	....	3	....	....	....	17,928	1,187	703	109	328	18
New York	1	32,191	3	99	3,531	940,577	1,514,476	57,963	56,956	1,774	259
New Jersey	....	230	....	....	200	182,965	48,657	16,525	8,241	23	....
Pennsylvania	44	1,640	....	189	2,174	580,307	810,030	41,728	24,209	285	168
Delaware	....	....	....	....	....	11,174	8,112	904	2,126	....	9
Maryland	63	18	....	....	254	85,686	14,481	2,446	1,570	39	8
Dist. of Columbia	....	....	....	....	....	....	....	....	....	....	....
Virginia	88	5	51	3	4	1,000,450	487,330	52,318	30,673	517	225
North Carolina	36	....	3	....	3,016	593,796	216,490	38,196	20,008	229	333
South Carolina	....	1	....	....	....	333	844	55	818	123	20
Georgia	....	1	....	....	30	5,387	3,303	622	96	313	72
Florida	....	....	....	....	1	50	....	....	....	6	....
Alabama	....	....	....	....	....	3,921	109	69	68	167	....
Mississippi	7	6	....	....	....	665	....	26	10	2	....
Louisiana	....	....	....	....	....	....	....	....	....	29	....
Texas	....	....	....	10	....	1,048	....	26	....	22	26
Arkansas	....	140	15	30	676	12,291	3,233	321	541	85	1
Tennessee	454	6	141	10	787	368,131	161,740	18,904	9,611	1,923	50
Kentucky	16,432	33,044	1,855	2,026	4,344	2,100,116	728,234	75,801	28,881	1,231	340
Ohio	100	....	50	....	3	446,932	....	188,880	250,768	1,552	2,166
Michigan	....	....	....	....	....	7,152	3,859	519	228	108	1,043
Indiana	....	....	....	....	1	584,469	73,112	36,888	155,159	387	959
Illinois	....	....	....	....	....	160,063	32,686	10,787	11,202	47	436
Wisconsin	....	97	....	15	244	68,393	21,644	1,191	4,256	....	15
Minnesota	....	....	....	....	....	....	1,968	....	73	....	....
Iowa	....	....	....	....	....	62,660	28,888	1,959	6,180	246	217
Missouri	15,968	15,789	60	1,507	1,972	527,160	109,837	13,696	4,656	186	127
Kansas	....	44	....	....	....	....	13	....	9	....	....
California	....	....	....	....	....	....	....	....	....	....	....
Oregon	....	5	....	....	....	640	50	....	4	....	....
Washington	....	....	....	....	....	....	89	....	....	....	....
Utah	....	....	....	1	....	550	4,197	5	145	....	1
New Mexico	....	....	....	....	....	....	....	....	....	....	....
Nebraska	....	7	....	2	....	....	....	....	2	....	....
Dacotah	....	....	....	....	....	....	....	....	....	....	....

TABLE IX.—AGRICULTURAL STATISTICS.—*Continued.*

States and Territories.	Maple sugar, lbs.		Cane sugar, hhds. (1,000 lbs. each).		Molasses, gallons.*			Beeswax and honey, lbs.	Bees-wax, lbs.	Honey, lbs.	Value of home-made manufactures.	
					1850.	1860.						
	1850.	1860.	1850.	1860.	Cane and maple.	Cane and maple.	Sorghum.	1850.	1860.	1860.	1850.	1860.
Maine	93,542	306,742	....	....	3,167	....	....	189,618	8,769	314,685	$513,599	$490,787
N. Hampshire	1,298,863	2,255,012	....	....	9,811	....	....	117,140	4,936	125,142	393,455	251,013
Vermont	6,349,357	9,819,939	....	....	5,997	....	....	249,422	8,258	204,647	267,710	63,295
Massachusetts	795,525	1,006,078	....	....	4,693	....	....	59,508	3,289	59,125	205,333	245,886
Rhode Island	28	....	....	....	4	5	....	6,347	540	5,261	26,495	7,824
Connecticut	50,796	44,259	....	....	665	2,277	395	93,304	4,371	62,730	192,252	48,954
New York	10,357,484	10,816,458	....	....	56,539	131,856	265	1,755,830	121,019	2,369,751	1,280,333	717,865
New Jersey	2,197	3,455	....	....	954	8,124	360	156,694	8,130	185,925	112,781	27,588
Pennsylvania	2,326,525	2,768,965	....	....	50,652	127,455	9,605	839,509	52,570	1,402,128	749,132	544,732
Delaware	....	....	....	....	50	761	852	41,248	1,993	66,137	38,121	17,591
Maryland	47,740	63,281	....	....	1,430	2,449	862	74,802	6,960	193,354	111,828	67,008
Dist. Columbia	....	....	....	....	....	....	....	550	24	510	2,075	440
Virginia	1,227,665	937,643	....	....	40,322	100,189	221,017	880,767	94,861	1,430,811	2,156,312	1,575,585
North Carolina	27,932	30,845	....	38	704	30,253	263,475	512,289	170,495	2,055,969	2,086,522	2,045,372
South Carolina	200	205	671	198	15,904	15,144	51,041	216,281	40,479	526,077	909,525	815,117
Georgia	50	991	1,642	1,167	216,150	546,790	103,450	732,514	61,505	953,915	1,838,968	1,431,413
Florida	....	....	2,750	1,761	352,893	435,890	....	18,971	10,883	1,168,540	75,582	62,243
Alabama	643	543	8,242	108	83,428	81,694	67,172	897,021	153,018	1,189,073	1,934,120	1,930,175
Mississippi	....	99	388	244	18,318	21,734	8,207	397,460	40,449	595,859	1,164,020	1,318,426
Louisiana	255	....	226,001	297,816	10,931,177	14,601,627	....	96,701	4,748	90,770	139,232	508,124
Texas	....	69	7,351	590	441,918	392,537	115,051	380,825	26,585	550,708	266,984	596,169
Arkansas	9,330	3,097	....	....	18	115,678	....	192,338	50,797	802,748	638,217	928,451
Tennessee	158,557	117,359	248	....	7,223	301,076	485,828	1,036,572	104,286	1,494,680	3,137,790	3,166,195
Kentucky	437,405	380,941	284	....	30,079	139,036	365,861	1,158,019	68,340	1,768,692	2,459,128	2,095,578
Ohio	4,588,209	3,323,942	....	....	197,308	392,932	707,416	804,275	52,415	1,389,292	1,712,196	606,081
Michigan	2,439,794	2,988,018	....	....	19,823	384,521	266,509	359,232	41,972	728,900	340,947	148,181
Indiana	2,921,192	1,515,594	....	....	180,325	203,028	827,777	935,329	35,074	1,186,865	1,631,039	847,351
Illinois	248,904	131,751	....	....	8,354	21,423	797,096	869,444	56,874	1,333,280	1,155,902	938,815
Wisconsin	610,976	1,584,406	....	283	9,874	88,003	19,253	131,005	8,009	207,184	43,624	125,428
Minnesota	2,950	370,947	....	....	....	21,829	14,974	80	2,083	32,840	....	8,057
Iowa	78,407	248,951	....	....	3,162	97,751	1,993,474	321,711	32,802	919,750	221,292	314,016
Missouri	178,910	142,430	....	....	5,636	22,305	776,101	1,328,972	79,190	1,585,983	1,674,705	1,984,262
Kansas	....	1,548	....	....	....	2	79,482	....	467	14,942	....	15,371
California	....	....	....	....	....	....	100	....	570	2,370	7,000	265,674
Oregon	....	....	....	....	24	....	419	....	384	627	....	45,914
Washington	....	....	....	....	....	....	....	....	564	5,256	...	33,506
Utah	....	....	....	....	58	....	32,509	10	3	....	1,392	69,648
New Mexico	....	....	....	....	4,236	....	3,369	2	....	....	6,033	26,396
Nebraska	....	316	....	....	....	275	23,105	....	202	9,465	....	1,776
Dacotah	....	....	....	....	....	20	....	....	....	....	....	....

TABLE X.—TOTAL AGRICULTURAL PRODUCTIONS OF THE UNITED STATES DURING THE YEARS ENDING JUNE 1, 1850, AND JUNE 1, 1860.

Productions.	1850.	1860.	Productions.	1850.	1860.
Improved land in farms, acres	113,032,614	163,261,389	Buckwheat, bushels	8,956,912	17,664,914
Unimproved land in farms, acres	180,528,000	246,508,244	Value of orchard products	$7,723,186	$19,759,361
Cash value of farms	$3,271,575,426	$6,650,872,507	Wine, gallons	221,249	1,860,008
Value of farming implements and machinery	$151,587,638	$247,027,496	Value of produce of market gardens	$5,280,030	15,541,027
Horses	4,336,719	6,115,458	Butter, pounds	313,345,306	460,509,854
Asses and mules	559,331	1,129,553	Cheese, pounds	105,535,893	105,875,135
Milch cows	6,385,094	8,728,862	Hay, tons	13,838,642	19,129,128
Working oxen	1,700,700	2,240,075	Clover seed, bushels	468,978	929,010
Other cattle	9,693,069	14,671,400	Other grass seeds, bushels	416,831	900,886
Sheep	21,723,220	23,317,756	Hops, pounds	3,497,029	11,009,538
Swine	30,354,213	32,555,267	Dew-rotted hemp, tons	33,193	88,947
Value of live stock	$544,180,516	$1,107,490,216	Water-rotted hemp, tons	1,678	8,948
Value of animals slaughtered	$111,703,142	$212,871,653	Other prepared hemp, tons	.....	17,[illegible]
Wheat, bushels	100,485,944	171,183,381	Flax, pounds	7,709,676	8,783,079
Rye, bushels	14,188,813	20,976,286	Flaxseed, bushels	562,312	611,987
Indian corn, bushels	592,071,104	830,451,707	Silk cocoons, pounds	10,843	6,583
Oats, bushels	146,584,179	172,554,688	Maple sugar, pounds	34,253,436	38,863,884
Rice, pounds	215,313,497	187,140,173	Cane sugar, hhds. of 1,000 lbs.	247,577	302,205
Tobacco, pounds	199,752,655	429,390,771	Molasses, gallons	12,700,896	18,231,674
Ginned cotton, bales of 400 lbs. each	2,469,093	5,186,788½	Maple molasses, gallons	.....	1,944,594
Wool, pounds	52,516,959	60,511,343	Cane molasses, gallons	.....	16,337,080
Peas and beans, bushels	9,219,901	15,188,013	Sorghum molasses, gallons	.....	7,235,025
Irish potatoes, bushels	65,797,896	110,571,201	Beeswax and honey, pounds	14,853,790	26,356,555
Sweet potatoes, bushels	38,268,148	41,606,302	Beeswax, pounds	.....	1,357,864
Barley, bushels	5,167,015	15,635,119	Honey, pounds	.....	25,028,991
			Val. of home-made manufactures	$27,493,644	$24,358,229

* Cane and maple molasses are returned together in the census of 1850, and separately in that of 1860. The product of Delaware and Missouri in 1860 was all cane molasses; of that of North Carolina, 12,494 galls. was cane, and 17,759 maple; of Mississippi, 8,445 cane; of Louisiana, 66,470 maple; of Texas, 8,600 maple; and of Tennessee, 6,754 maple. In all other cases, the kind of molasses, with slight exceptions, corresponds with that of the sugar produced. The culture of sorghum has been introduced since 1850.

Table XI.—Products of Manufactures, Mining, and the Mechanic Arts, 1850 and 1860.

States and Territories.	Number of establishments.		Capital invested in real and personal estate.		Value of raw material used, including fuel.		Average number of hands employed.		Value of annual product.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	3,974	3,582	$14,699,152	$22,000,000	$13,553,144	$20,861,452	28,020	39,710	$24,661,057	$36,075,498
N. Hampshire	3,211	2,582	18,242,114	25,900,000	12,745,466	24,400,000	27,092	36,100	23,164,503	45,500,000
Vermont	1,849	1,501	5,001,377	9,500,000	4,172,552	8,110,000	8,445	10,800	8,570,920	16,000,000
Massachus'tts	8,252	1,766	88,940,292	133,000,000	85,856,771	141,000,000	177,461	216,800	157,743,994	266,000,000
Rhode Island	864	1,160	12,935,676	23,300,000	13,186,703	23,400,000	20,967	33,200	22,117,688	47,500,000
Connecticut	3,737	2,928	25,876,648	45,720,000	23,608,971	40,140,000	50,731	65,780	47,114,585	83,000,000
New York	23,553	23,236	99,904,405	175,449,206	134,655,674	209,899,890	199,349	221,481	237,597,249	379,623,560
New Jersey	4,207	4,060	22,293,258	40,000,000	22,011,871	42,600,000	37,830	127,720	9,364,740	81,000,000
Pennsylvania	21,605	21,100	94,473,810	189,000,000	87,206,377	145,300,000	146,766	223,250	87,163,232	285,500,000
Delaware	531	564	2,978,945	5,360,000	2,864,607	5,375,000	3,888	6,192	4,649,296	9,920,000
Maryland	3,725	2,980	14,934,450	51,800,000	7,690,836	21,900,000	30,212	40,900	33,043,892	43,000,000
Dist. Col'bia.	403	424	1,001,575	2,650,000	1,405,811	2,801,000	2,570	2,834	2,690,258	5,088,000
Virginia	4,740	4,890	18,109,143	26,640,000	18,101,031	30,880,000	29,110	36,590	29,602,507	51,300,000
N. Carolina	2,663	2,790	7,456,860	9,310,000	4,602,501	9,860,000	14,601	13,890	9,111,050	14,450,000
S. Carolina	1,430	1,050	6,053,265	5,610,000	2,787,534	3,620,000	7,066	6,800	7,045,477	6,800,000
Georgia	1,522	1,724	5,456,483	11,160,000	3,404,917	10,000,000	8,368	12,090	7,082,075	13,700,000
Florida	103	180	547,060	6,675,000	220,611	965,000	991	2,480	668,335	2,700,000
Alabama	1,026	1,117	3,450,606	8,260,000	2,224,960	4,400,000	4,936	7,760	4,598,876	9,400,000
Mississippi	947	860	1,815,820	3,740,000	1,275,771	2,460,000	3,154	4,690	2,912,068	6,000,000
Louisiana	1,008	1,710	5,032,424	7,110,000	2,459,508	7,380,000	6,317	7,690	6,779,417	15,500,000
Texas	309	910	539,290	3,850,000	394,642	2,770,000	1,066	3,470	1,168,538	6,250,000
Arkansas	261	375	305,015	1,040,000	215,789	909,000	842	1,555	537,908	2,150,000
Tennessee	2,887	2,420	6,527,729	17,270,000	5,166,886	9,365,000	12,039	13,095	9,725,608	17,100,000
Kentucky	3,609	3,160	11,810,462	20,000,000	12,165,075	21,380,000	21,516	22,040	21,710,212	36,330,000
Ohio	10,622	10,710	29,019,538	58,000,000	34,678,019	70,000,000	51,491	81,200	62,692,279	125,000,000
Michigan	2,033	2,530	6,563,660	24,000,000	6,136,328	19,000,000	9,344	24,120	11,169,002	35,200,000
Indiana	4,392	5,120	7,750,402	18,875,000	10,369,700	27,860,000	14,440	21,310	18,725,423	43,250,000
Illinois	3,162	4,100	6,217,765	27,700,000	8,959,327	33,800,000	11,559	24,370	16,534,272	56,750,000
Wisconsin	1,262	3,120	3,382,148	16,580,000	5,414,931	17,250,000	6,089	17,090	9,293,068	28,500,000
Minnesota	5	565	94,000	2,400,000	24,300	2,060,000	63	2,230	58,300	3,600,000
Iowa	522	1,790	1,292,875	7,500,000	2,356,881	8,500,000	1,707	6,577	3,551,783	14,900,000
Missouri	2,923	2,800	8,576,607	20,500,000	12,798,351	24,000,000	15,800	21,330	24,324,418	43,500,000
Kansas	..	299	....	1,063,000	....	669,269	..	1,719	....	2,800,000
California	1,003	3,505	1,006,197	23,682,593	1,201,154	16,558,636	3,964	24,266	12,862,522	59,500,000
Oregon	52	300	843,600	1,293,000	809,560	1,452,000	285	1,006	2,236,640	3,138,000
Washington	..	52	....	1,296,700	....	505,000	..	890	....	1,405,000
Utah	14	152	44,400	412,126	337,381	398,528	51	357	291,220	823,000
New Mexico	23	86	68,300	1,296,700	110,220	432,000	81	979	249,010	1,165,000
Nebraska	..	107	....	271,475	....	238,225	..	339	....	581,942
Total	123,025	122,300	533,245,351	1,050,000,000	555,123,822	1,012,000,000	957,059	1,384,200	1,019,106,616	1,900,000,000

Table XII.—Statistics of Leading Manufactures, 1850 and 1860.

States.	Cotton Goods.								1860.	
	No. of establishments.		Capital.		Cotton consumed, bales.	Cotton consumed, pounds.	Value of raw material.		Number of	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	Spindles.	Looms.
Maine	18	19	$3,347,700	$6,108,325	31,531	16,588,128	$1,600,430	$3,000,000	800,000	6,000
New Hampshire	48	44	10,974,700	13,878,000	83,026	39,212,644	4,888,304	9,758,921	669,885	17,015
Vermont	11	10	197,500	321,000	2,243	1,057,250	170,604	133,000	19,712	424
Massachusetts	229	200	27,846,720	38,300,000	223,607	126,666,089	12,446,849	14,778,344	1,739,700	44,978
Rhode Island	159	185	6,572,195	11,500,000	50,713	38,521,608	3,515,769	5,281,000	766,000	26,000
Connecticut	106	64	4,012,600	6,000,000	39,483	15,799,140	2,342,084	4,000,000	464,000	8,787
New York	118	70	5,554,320	5,427,079	37,738	25,910,876	2,888,465	2,988,270	328,816	7,511
New Jersey	29	29	1,691,000	1,845,000	14,437	2,257,885	741,086	1,693,668	96,112	1,181
Pennsylvania	136	151*	4,671,015	8,253,640	44,162	32,855,669	3,356,108	6,732,275	358,578	10,678
Delaware	12	11	585,100	572,000	4,730	2,717,000	314,768	521,492	25,704	494
Maryland	33	19	2,248,600	2,214,500	23,325	12,020,119	1,353,361	1,641,918	49,891	1,529
Dist. of Columbia	1	1	85,000	45,000	960	294,117	67,000	47,403	2,560	82
Virginia	25	18	1,898,200	1,325,243	17,785	7,302,797	836,681	770,977	28,700	524
North Carolina	85	36	1,827,400	1,049,750	13,617	5,152,750	629,118	564,612	30,144	479
South Carolina	19	17	902,600	827,825	9,929	8,845,811	401,921	419,500	16,461	931
Georgia	29	32	1,898,256	1,854,603	20,230	12,977,904	832,804	1,689,075	44,312	1,058
Florida	1	1	60,000	80,000	600	200,000	30,000	22,000	....	..
Alabama	18	11	681,900	1,306,500	5,208	4,389,641	270,671	623,968	28,540	663
Mississippi	1	4	85,000	350,000	430	534,400	15,000	163,419	1,844	28
Louisiana	..	2	....	1,075,000	....	1,995,700	....	283,900	4,225	150
Texas	..	1	....	500,000	....	588,000	....	78,920	2,700	100
Arkansas	8	1	16,500	55,000	170	60,000	9,275	6,750	....	..
Tennessee	32	25	647,272	930,000	6,411	3,172,000	291,060	283,838	7,914	80
Kentucky	10	4	545,000	104,000	8,760	311,000	275,407	139,000	9,500	..
Ohio	9	7	537,500	250,000	4,270	1,815,000	859,618	250,000	15,000	400
Indiana	5	2	74,500	250,000	675	800,000	55,220	100,000	11,000	875
Illinois	..	8	....	10,000	....	40,000	....	8,000	....	..
Missouri	2	8	102,000	169,000	2,160	100,000	86,446	14,500	14,500	..
Total	1,074	915	$76,032,578	$99,551,465	641,200	857,185,528	$87,778,064	$55,994,785	5,035,798	129,458

* Of which 91, with a capital of $2,935,500, and producing $5,697,000, were in Philadelphia.

TABLE XII.—STATISTICS OF LEADING MANUFACTURES.—*Continued.*

States.	Cotton Goods. Average number of hands employed. 1850. Males.	1850. Females.	1860. Males.	1860. Females.	Annual cost of labor. 1850.	Annual cost of labor. 1860.	Value of annual products. 1850.	Value of annual products. 1860.	Woollen Goods. No. of establishments. 1850.	No. of establishments. 1860.	Capital invested. 1850.	Capital invested. 1860.
Maine	849	3,072	1,908	4,342	$751,536	$1,244,928	$2,630,616	$6,636,623	88	61	$672,685	$959,400
New Hampshire	2,915	9,235	6,300	13,859	2,343,360	4,574,520	8,861,749	16,661,531	91	71	2,447,500	1,519,550
Vermont	123	207	142	225	55,392	78,468	280,300	357,400	96	50	1,015,175	1,781,550
Massachusetts	9,592	20,284	12,635	22,353	6,042,024	7,221,156	21,394,401	36,745,864	135	131	8,811,942	10,179,500
Rhode Island	4,847	5,901	5,474	6,615	2,031,036	2,417,640	6,495,972	12,258,657	52	50	1,097,300	2,986,000
Connecticut	2,665	3,313	3,314	4,275	1,077,024	1,453,128	4,122,952	7,641,460	120	90	2,597,592	2,494,000
New York	3,379	5,499	3,043	4,288	1,443,780	1,271,592	5,019,323	7,471,961	440	235	4,481,930	4,598,263
New Jersey	739	1,299	853	1,371	308,124	435,684	1,289,648	3,250,770	53	35	547,074	937,400
Pennsylvania	4,283	4,374	5,350	7,370	1,875,344	2,265,912	5,812,126	11,759,000	320	447	1,953,968	5,642,425
Delaware	413	425	486	521	134,304	202,884	538,439	919,103	7	6	137,800	98,000
Maryland	1,212	2,035	947	1,568	435,768	464,112	2,021,396	2,796,877	41	25	257,100	287,200
Dist. of Columbia	41	103	70	25	16,800	19,800	100,000	74,400	..	..	....	....
Virginia	1,151	1,578	741	952	282,672	262,440	1,446,109	1,063,611	124	69	394,480	476,580
North Carolina	492	1,372	416	1,210	169,272	168,840	985,411	930,567	14	22	85,250	286,700
South Carolina	436	676	372	584	155,472	132,180	842,440	588,950	5	8	5,700	9,500
Georgia	816	1,291	1,376	1,909	225,180	482,520	1,395,056	2,215,636	..	28	....	174,600
Florida	28	67	40	25	9,540	7,872	49,920	40,000	..	..	....	....
Alabama	349	397	567	765	89,520	206,124	398,585	917,105	8	15	9,000	100,000
Mississippi	16	14	155	155	3,804	33,996	22,000	261,135	7	9	7,400	109,500
Louisiana	..	..	70	70	....	24,000	....	509,700	..	..	....	....
Texas	..	..	160	..	....	36,480	....	99,241	2	9	9,000	24,100
Arkansas	14	18	20	10	3,840	7,200	17,360	13,000	2	8	6,500	8,550
Tennessee	316	592	244	437	97,536	109,764	508,481	533,348	54	59	63,167	128,650
Kentucky	210	316	93	58	73,572	21,000	445,639	167,500	131	92	256,280	645,800
Ohio	268	434	270	340	104,808	112,400	594,204	629,500	269	113	1,086,566	623,650
Michigan	..	..	..	..	....	....	....	....	40	20	141,500	139,500
Indiana	66	79	176	190	17,964	72,468	86,660	349,000	127	84	308,783	458,144
Illinois	..	..	8	8	....	1,980	....	15,987	79	33	228,120	238,450
Wisconsin	..	..	..	..	....	....	....	....	11	15	31,025	96,800
Iowa	..	..	..	..	....	....	....	....	27	23	49,550	109,100
Missouri	75	80	85	85	19,440	31,080	142,900	230,000	94	99	20,000	212,845
California	..	..	..	..	....	....	....	....	..	1	....	100,000
Oregon	..	..	..	..	....	....	....	....	..	1	....	70,000
Total	35,295	621,661	45,315	73,605	$17,267,112	$23,360,168	$65,501,687	$115,237,926	2,447	1,909	$26,811,467	$35,520,527

States.	Woollen Goods. Pounds of wool consumed. 1850.	Pounds of wool consumed. 1860.	Pounds of cotton used in woollens. 1860.	Cost of raw material. 1850.	Cost of raw material. 1860.	1860. Number of Spindles.	1860. Number of Looms.	Average number of hands employed. 1850. Males.	1850. Females.	1860. Males.	1860. Females.
Maine	1,438,434	2,646,200	100,000	$701,359	$1,047,496	11,765	185	435	392	604	499
New Hampshire	3,604,103	3,596,730	321,280	1,272,835	1,732,074	36,320	696	878	1,021	1,003	1,008
Vermont	2,328,100	3,303,500	59,300	1,077,023	1,679,594	23,371	463	800	812	830	1,065
Massachusetts	22,229,952	26,271,200	3,589,500	8,140,229	11,613,174	159,651	4,237	5,893	4,863	6,645	4,608
Rhode Island	4,103,370	5,000,000	1,881,200	1,689,884	3,920,155	86,048	1,586	1,040	834	2,483	1,568
Connecticut	9,414,100	8,000,000	995,932	2,860,118	4,206,000	76,178	1,758	2,116	1,669	2,291	1,460
New York	12,538,786	11,708,230	2,685,000	4,778,584	4,979,631	87,887	1,686	3,974	3,185	3,786	4,255
New Jersey	1,510,289	1,712,000	656,000	517,028	682,743	10,361	270	523	469	812	527
Pennsylvania	7,560,379	6,223,850	4,753,413	1,897,757	6,770,347	108,326	4,334	1,910	789	6,682	4,029
Delaware	393,000	147,500	120,000	202,385	78,807	1,000	76	115	86	79	88
Maryland	430,000	955,800	77,000	175,918	254,874	2,480	66	264	106	228	127
Virginia	1,554,110	1,329,738	70,000	486,123	466,020	7,574	121	376	188	517	108
North Carolina	30,000	441,290	125,000	47,970	170,111	1,000	20	53	39	145	149
South Carolina	153,816	37,800	....	10,100	13,420	....	....	2	....	10	....
Georgia	....	1,500,000	150,000	....	243,700	1,480	20	....	....	62	45
Alabama	....	342,235	20,000	16,040	90,000	1,000	20	18	3	46	28
Mississippi	....	376,400	107,000	9,190	133,290	1,000	21	9	2	204	20
Texas	30,000	106,250	18,000	14,500	30,950	....	....	6	4	17	7
Arkansas	....	90,800	20,000	6,500	26,960	....	....	7	5	9	....
Tennessee	6,200	570,865	260,000	76,342	143,151	500	....	87	3	145	58
Kentucky	673,900	1,310,700	....	369,580	598,445	3,990	94	348	16	539	119
Ohio	1,657,726	1,054,540	....	817,703	393,344	5,827	96	1,216	322	356	153
Michigan	162,250	223,100	....	109,329	91,090	1,000	20	146	58	98	50
Indiana	413,350	1,009,000	....	324,103	344,500	8,266	177	382	62	561	95
Illinois	396,964	545,000	....	139,239	182,320	1,000	20	225	55	173	83
Wisconsin	134,200	212,400	....	26,863	56,820	1,000	20	19	....	78	24
Iowa	14,500	265,200	....	75,315	103,373	1,000	20	60	....	120	21
Missouri	80,000	856,244	....	16,000	230,911	896	29	15	10	190	14
California	....	400,000	....	....	50,000	500	30	....	....	40	20
Oregon	....	150,000	....	....	27,000	280	15	....	....	27	13
Total	70,862,829	80,386,572	16,008,625	$26,164,005	$40,461,300	639,600	16,075	20,990	14,998	28,780	20,120

TABLE XII.—STATISTICS OF LEADING MANUFACTURES.—*Continued.*

States d Territories.	Woollen Goods.				Leather.		Pig Iron.			
	Annual cost of labor.		Annual product.		Value.		Tons of ore mined.		Tons of pig iron produced.	
	* 1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	$172,608	$277,440	$1,022,929	$1,674,800	$1,701,299	$2,011,034	2,907	....	1,484	..
New Hampshire	408,672	499,764	2,139,967	2,376,000	944,554	1,933,949	500	....	200	..
Vermont	347,184	388,956	1,820,769	2,550,000	640,665	1,000,053	7,676	4,500	3,200	8,224
Massachusetts	2,418,864	2,645,868	12,781,514	18,930,000	5,672,559	10,354,056	27,909	25,000	12,287	18,700
Rhode Island	406,808	1,012,836	2,504,700	6,599,280	133,050	80,897	....	....	..	..
Connecticut	838,572	917,437	4,974,959	5,879,000	775,325	953,782	35,450	20,700	18,420	11,000
New York	1,400,892	1,591,248	7,605,774	9,090,816	9,802,670	20,758,017	46,385	176,875	28,022	68,145
New Jersey	184,404	320,304	1,025,000	1,527,209	1,269,982	1,297,627	51,266	160,172	24,031	29,048
Pennsylvania	568,656	2,239,986	6,077,357	12,744,878	6,296,363	12,491,631	877,283	1,406,476	255,702	558,460
Delaware	30,900	27,888	244,510	156,635	213,742	37,240	....	....	..	..
Maryland	78,728	77,868	319,240	581,955	1,426,734	1,723,033	99,866	79,200	43,641	80,500
Dist. of Columbia	....	....	....	....	56,000	37,000	....	....	..	..
Virginia	124,716	114,686	826,746	809,760	927,877	1,218,700	67,819	23,217	22,168	9,096
North Carolina	11,916	46,092	71,470	260,279	363,647	343,020	900	....	400	..
South Carolina	2,256	1,964	15,000	17,177	282,399	150,985	....	....	..	..
Georgia	....	17,480	....	465,000	403,439	393,164	5,189	....	900	..
Florida	....	....	....	....	9,200	....	....	....	..	..
Alabama	3,490	18,000	21,800	218,000	344,445	340,400	1,838	....	522	..
Mississippi	2,256	12,408	31,670	184,500	241,632	223,862	....	....	..	..
Louisiana	....	....	....	....	78,085	47,000	....	....	..	..
Texas	2,400	6,780	22,000	49,125	52,600	123,050	....	....	..	..
Arkansas	1,800	1,680	8,800	31,840	78,824	115,375	....	....	..	..
Tennessee	14,743	36,636	111,225	267,622	804,631	1,118,850	88,810	53,220	30,420	18,417
Kentucky	68,852	181,840	808,507	1,128,882	1,108,533	701,555	72,010	73,600	24,245	28,862
Ohio	335,904	137,064	1,518,978	692,333	2,110,982	2,799,239	140,610	228,794	52,658	94,647
Michigan	46,368	38,816	205,013	174,898	401,730	574,172	2,700	17,900	660	1,400
Indiana	100,152	165,108	528,700	695,870	750,801	800,387	5,200	....	1,850	875
Illinois	64,572	51,072	370,870	266,230	337,384	150,000	5,500	....	2,700	..
Wisconsin	7,632	26,868	60,105	167,600	181,010	498,268	8,000	4,500	1,000	2,000
Minnesota	....	....	....	....	....	11,400	....	....	..	..
Iowa	18,992	35,916	112,454	167,960	24,550	81,760	....	....	..	..
Missouri	6,450	47,172	358,427	425,819	866,861	868,826	87,000	42,000	19,250	22,000
Kansas	....	....	....	....	....	850	....	....	..	..
California	....	38,600	....	150,000	....	226,214	....	....	..	..
Oregon	....	16,200	....	85,000	....	14,500	....	....	..	..
Washington	....	....	....	....	....	17,500	....	....	..	..
Utah	....	....	....	....	....	98,255	....	....	..	..
Total	$7,898,872	$10,937,877	$45,578,432	$68,865,963	$37,702,333	$63,091,651	1,579,318	2,315,654	563,755	875,874

States and Territories.	Pig Iron.		Rolled Iron.		Steam Engines and Machinery.		Agricultural Implements.	
	Value.		1860.		Value.		Value.	
	1850.	1860.	Tons.	Value.	1850.†	1860.	1850.	1860.
Maine	$36,616	....	5,800	$332,000	$648,180	$681,295	$259,787	$339,180
New Hampshire	6,000	....	70	7,000	606,170	898,560	119,096	184,935
Vermont	68,000	$92,910	1,100	68,250	863,494	493,886	133,355	157,647
Massachusetts	293,123	403,000	20,285	1,291,200	5,220,482	5,131,288	820,141	1,740,948
Rhode Island	....	....	..	....	1,210,728	1,068,825	72,000	117,845
Connecticut	415,600	379,500	2,060	175,500	785,455	1,958,585	258,047	266,162
New York	597,920	1,885,208	38,275	2,215,250	8,422,744	10,484,863	1,266,276	3,429,037
New Jersey	560,544	574,820	25,006	1,870,725	890,123	8,215,678	72,686	198,211
Pennsylvania	6,071,518	11,424,879	259,709	12,643,500	4,214,218	7,243,458	858,513	1,455,760
Delaware	....	....	..	....	801,044	550,500	15,175	90,581
Maryland	1,056,400	789,600	7,000	556,000	910,100	1,285,000	257,656	818,980
Dist. of Columbia	....	....	..	....	17,000	180,588	6,550	....
Virginia	521,924	251,173	7,108	609,310	439,455	1,478,036	213,906	339,959
North Carolina	12,500	....	1,007	92,948	84,800	92,750	32,980	40,000
South Carolina	....	....	275	24,750	73,400	462,192	29,989	4,800
Georgia	57,800	....	..	....	69,000	875,825	228,687	252,075
Florida	....	....	..	....	....	81,000	....	17,600
Alabama	22,500	....	..	....	140,075	524,350	84,500	583,678
Mississippi	....	....	..	....	80,000	528,000	109,260	94,283
Louisiana	....	....	..	....	....	818,400	25,610	86,408
Texas	....	....	..	....	5,850	55,000	....	140,000
Arkansas	....	....	..	....	9,600	21,750	11,900	5,700
Tennessee	676,100	457,000	5,024	483,248	81,604	174,000	97,570	17,980
Kentucky	604,037	534,164	6,200	514,000	319,740	1,004,664	184,615	597,118
Ohio	1,255,850	2,327,261	10,439	692,000	2,153,297	4,855,005	557,932	2,690,943
Michigan	21,000	291,400	..	....	329,050	809,082	80,600	412,192
Indiana	58,000	9,375	2,000	105,000	215,970	426,805	146,025	709,645
Illinois	70,200	....	..	....	247,595	807,500	761,970	2,552,165
Wisconsin	27,000	40,000	..	....	124,790	884,600	187,835	568,855
Minnesota	....	....	..	....	....	....	....	17,000
Iowa	....	....	..	....	6,200	186,720	17,900	112,590
Missouri	314,600	575,000	4,678	585,000	228,675	719,500	87,550	280,037
Kansas	....	....	..	....	....	40,000	....	20,000
California	....	....	..	....	....	1,600,510	....	9,375
Oregon	....	....	..	....	....	71,000	....	5,880
Utah	....	....	..	....	....	15,000	....	....
Total	$12,748,727*	$19,921,280	395,536	$21,710,681	$27,998,844	$46,117,550	$6,842,611	$17,802,514

* Including other products to the value of $259,700.

† Machinists and millwrights.

TABLE XII.—STATISTICS OF LEADING MANUFACTURES, 1850 AND 1860.—*Continued.*

States and Territories.	Sawed and Planed Lumber. Value.		Flour. Value.		Salt. Bushels.		Salt. Value.		Liquors. Malt.		Liquors. Spirituous.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.*	1850.	1860.*
Me.	$5,872,578	$6,750,000	$946,358	$1,400,000	....	....	$9,700	....	$1,500	$36,000	$60,000	$142,000
N. H...	1,099,492	1,280,000	1,127,016	1,490,000	....	....	....	....	....	86,000	....	....
Vt.	618,065	1,060,000	719,231	1,660,000	....	....	....	....	8,000	....	....	....
Mass...	1,552,265	2,290,000	2,475,583	4,200,000	....	81,000	93,850	$8,000	172,850	659,000	1,326,330	1,966,000
R. I....	241,556	170,000	90,651	510,000	....	....	....	....	21,900	81,000	....	....
Conn. .	584,794	580,000	961,677	1,720,000	40,000	....	5,600	....	1,200	91,000	64,300	109,000
N. Y...	13,126,759	10,810,000	33,087,121	33,100,000	4,500,000	7,521,000	998,815	1,289,000	2,588,857	4,996,000	4,670,497	7,696,000
N. J...	1,123,052	1,600,000	4,056,761	6,400,000	....	....	....	....	210,616	866,000	394,160	491,000
Penn. .	7,729,058	11,811,000	24,115,575	26,570,000	919,100	604,000	161,796	154,000	1,178,191	3,247,000	1,905,180	2,183,000
Del....	236,863	260,000	1,214,017	1,840,000	....	....	....	....	....	....	....	....
Md. ...	585,168	720,000	5,499,265	8,020,000	....	....	....	....	122,720	242,000	566,064	330,000
D. C...	29,000	70,000	510,440	1,180,000	....	....	....	....	8,100	84,000	....	....
Va.....	977,412	2,540,000	9,408,892	15,210,000	3,479,890	2,056,000	700,466	479,000	80,000	....	294,909	....
N. C...	985,075	1,070,000	1,447,211	3,180,000	....	....	....	....	....	....	48,431	....
S. C....	1,108,880	1,080,000	1,151,128	880,000	....	....	....	....	....	....	18,260	....
Ga.	923,408	2,060,000	1,862,437	3,820,000	....	....	....	....	....	....	19,001	....
Fla....	391,084	1,470,000	28,575	850,000	....	....	6,000	....	....	....	....	....
Ala....	1,103,481	2,020,000	860,241	810,000	....	....	....	....	....	....	2,500	....
Miss...	913,197	2,050,000	461,838	540,000	....	....	....	....	....	....	....	....
La.....	1,129,677	1,020,000	93,939	12,000	....	....	....	....	17,000	....	67,500	....
Texas..	466,012	1,610,000	50,540	2,180,000	8,000	....	6,100	30,000	....	....	....	....
Ark....	122,918	1,030,000	115,875	450,000	....	....	....	....	....	....	....	....
Tenn. .	725,887	1,970,000	1,601,141	3,820,000	....	....	....	....	....	....	179,855	....
Ky. ...	1,502,434	2,200,000	2,182,223	5,030,000	246,500	70,000	57,825	21,000	92,800	220,000	471,807	909,000
Ohio ..	3,864,452	5,600,000	14,872,270	27,130,000	550,850	1,744,000	182,293	277,000	528,998	1,912,000	3,040,604	4,197,000
Mich...	2,464,329	7,030,000	4,093,681	8,660,000	....	....	....	....	48,890	855,000	230,230	74,000
Ind....	2,195,351	3,170,000	5,564,091	11,290,000	....	....	....	....	68,911	828,000	1,187,961	1,951,000
Ill.....	1,824,484	2,270,000	5,781,488	18,100,000	20,000	....	6,000	....	162,411	1,309,000	822,059	3,294,000
Wis....	1,218,516	4,840,000	3,536,293	8,160,000	....	....	....	....	158,899	708,000	47,050	161,000
Minn. .	57,800	820,000	500	1,810,000	....	....	....	....	....	78,000	....	16,000
Iowa ..	470,760	2,880,000	2,019,448	6,950,000	....	....	....	....	....	221,000	37,600	88,000
Mo. ...	1,479,124	3,700,000	5,124,003	9,000,000	....	....	....	....	318,825	1,143,000	310,862	309,000
Kan. ..	....	940,000	....	280,000	....	....	....	....	....	53,000	....	4,000
Cal....	959,485	4,210,000	754,192	4,340,000	....	44,000	....	7,000	1,400	1,212,000	....	342,000
Oregon	1,355,500	590,000	881,140	1,070,000	....	....	....	....	....	84,000	....	40,000
W. T. .	....	1,170,000	....	70,000	....	....	....	....	....	....	....	....
Utah..	14,620	180,000	253,000	240,000	....	....	....	....	8,000	4,000	....	7,000
N.M.T.	20,000	60,000	158,950	370,000	....	....	....	....	....	....	55,800	22,000
Neb. T.	....	320,000	....	110,000	....	....	....	....	....	16,000	....	....
Total	58,520,966	93,651,000	136,056,736	220,952,000	9,763,840	12,070,000	2,177,945	2,265,000	5,728,568	17,976,000	15,770,240	23,535,000

TABLE XIII.—ENTRANCES AND CLEARANCES IN THE UNITED STATES DURING THE YEAR ENDING JUNE 30, 1861.†

States.	Entrances. American vessels. Number.	Entrances. American vessels. Tons.	Entrances. Foreign vessels. Number.	Entrances. Foreign vessels. Tons.	Entrances. Total. Number.	Entrances. Total. Tons.	Clearances. American vessels. Number.	Clearances. American vessels. Tons.	Clearances. Foreign vessels. Number.	Clearances. Foreign vessels. Tons.	Clearances. Total. Number.	Clearances. Total. Tons.
Maine	478	161,204	538	93,821	1,016	254,525	937	230,517	567	94,857	1,504	325,374
New Hampshire	5	2,099	40	3,540	45	5,639	6	2,008	38	3,415	44	5,423
Vermont	193	10,193	261	21,884	454	32,077	150	7,747	261	20,589	411	28,336
Massachusetts	1,363	446,349	2,825	452,221	4,188	898,570	1,137	341,465	2,825	451,301	3,962	792,766
Rhode Island	73	16,439	106	18,673	179	35,112	52	11,202	90	13,647	142	24,849
Connecticut	109	23,607	68	11,359	177	34,966	68	13,024	54	9,000	122	22,024
New York	6,071	3,250,586	5,606	1,317,497	11,677	4,568,083	5,386	3,102,162	5,452	1,309,693	10,838	4,411,855
New Jersey	1	134	20	2,623	21	2,757	28	7,898	15	2,251	43	10,149
Pennsylvania	468	158,556	175	40,181	643	198,737	430	145,319	178	42,248	508	187,567
Delaware	4	779	..	....	4	779	14	3,057	2	520	16	3,577
Maryland	434	169,555	180	55,555	614	225,110	377	147,632	192	61,226	569	208,858
Dist. Columbia	1	168	2	231	3	399	..	....	..	..	..	..
Virginia	141	82,144	45	13,394	186	95,538	92	30,787	45	13,532	137	44,319
North Carolina	88	13,274	21	4,363	109	17,637	136	23,228	28	5,976	164	29,204
South Carolina	60	34,297	67	22,074	127	56,371	75	37,213	53	15,762	128	52,975
Georgia	11	8,508	17	8,156	28	16,664	26	10,429	12	5,124	38	15,553
Florida	242	47,663	29	2,862	80	67,646	300	57,762	27	2,910	327	60,672
Alabama	52	43,950	28	23,696	271	50,525	72	52,009	19	12,785	91	64,794
Louisiana	86	58,724	29	10,269	115	68,993	104	67,711	26	9,224	130	76,935
Texas	7	2,744	13	5,707	20	8,451	14	7,306	10	4,031	24	11,337
Ohio	314	62,498	241	24,731	555	87,229	229	37,412	242	25,249	471	62,661
Michigan	574	140,301	206	21,140	780	161,441	661	111,114	274	103,003	935	214,117
Illinois	158	70,465	43	12,133	201	82,598	865	138,424	45	11,999	410	150,423
Wisconsin	95	50,437	27	8,080	122	58,517	90	48,610	21	5,653	111	54,263
California	212	162,121	120	43,481	332	205,602	313	240,890	108	38,164	421	279,054
Oregon	11	7,122	2	383	13	7,505	17	14,391	2	383	19	14,774
Total	11,251	5,023,917	10,709	2,217,554	21,960	7,241,471	11,079	4,889,313	10,586	2,262,042	21,665	7,151,355

The crews of American vessels clearing from the United States consisted of 146,271 men and 929 boys; of foreign vessels, 104,059 men and 730 boys; total, 250,330 men and 1,659 boys. The crews of American vessels entering American ports consisted of 149,236 men and 464 boys; of foreign vessels, 105,173 men and 752 boys; total, 254,409 men and 1,230 boys.

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* Partial returns.

† See tables XXVI. and XXVII.

TABLE XIV.—DOMESTIC EXPORTS OF THE UNITED STATES DURING THE YEARS ENDING JUNE 30, 1857, 1859, AND 1860.

Articles.	1857.	1859.	1860.
PRODUCTS OF THE SEA.			
Oil, spermaceti	$1,216,888	$1,787,784	$1,789,069
Oil, whale and other fish	868,665	598,762	587,547
Whalebone	1,807,822	1,288,589	896,298
Spermaceti and sperm candles	70,088	46,278	51,829
Fish, dried or smoked	570,348	642,901	690,088
Fish, pickled	211,883	208,760	191,684
PRODUCTS OF THE FOREST.			
Staves and heading	2,055,980	2,410,884	2,865,516
Shingles	212,805	191,581	169,546
Board, plank, and scantling	4,170,686	3,817,298	2,777,919
Hewn timber	516,785	867,609	231,668
Other timber	688,406	1,001,216	705,119
Oak bark and other dyes	822,754	412,701	164,260
All manufactures of wood	8,158,424	2,889,861	2,708,095
Tar and pitch	208,610	141,058	151,404
Resin and turpentine	1,544,572	2,248,881	1,818,238
Ashes, pot and pearl	696,867	648,861	822,820
Ginseng	58,331	54,204	295,766
Skins and furs	1,116,041	1,861,352	1,588,208
PRODUCTS OF AGRICULTURE.			
Beef	1,218,848	2,188,056	2,674,824
Tallow	632,286	712,551	1,598,176
Hides	624,867	520,539	1,036,260
Horned cattle	144,840	1,345,058	1,032,426
Butter	593,084	750,911	1,144,321
Cheese	647,428	649,302	1,565,630
Pork (pickled)	2,805,867	3,355,746	3,132,318
Hams and bacon	4,511,442	1,263,042	2,273,768
Lard	5,144,195	3,268,406	4,545,381
Wool	19,007	355,568	389,512
Hogs	5,525	550,875	377,604
Horses	195,627	290,250	233,368
Mules	171,189	258,336	158,080
Sheep	22,758	41,182	83,618
Wheat	22,240,857	2,849,192	4,076,704
Flour	25,882,316	14,433,591	15,448,507
Indian corn	5,184,666	1,323,103	2,399,808
Indian meal	957,791	994,269	912,075
Rye meal	115,828	60,736	48,172
Rye, oats, and other small grain and pulse	680,108	1,181,170	1,058,804
Biscuit or ship bread	563,266	512,910	478,750
Potatoes	205,616	264,111	284,678
Apples	185,280	99,808	206,055
Onions	77,048	100,669	109,861
Rice	2,290,400	2,207,148	2,567,899
Cotton	131,575,859	161,434,923	191,806,555
Tobacco	20,260,772	21,074,038	15,906,547
Hemp	46,907	9,279	9,531
Clover seed	880,166	586,781	596,919
Flax seed	525	8,177	8,810
Brown sugar	190,012	196,935	103,244
Hops	84,852	58,016	82,866
MANUFACTURES.			
Refined sugar	868,206	877,944	801,674
Wax	91,983	94,850	181,808
Chocolate	1,982	2,444	2,598
Spirits from grain	1,248,234	278,576	311,595
Spirits from molasses	1,216,685	760,889	930,644
Spirits from other materials	120,011	188,746	219,199
Molasses	108,008	75,699	85,292
Vinegar	10,788	85,156	41,368
Beer, ale, porter, & cider, in casks	26,788	55,675	81,871
Do. in bottles	16,999	22,551	22,202
Linseed oil	54,144	84,194	26,799
Spirits of turpentine	741,346	1,806,085	1,916,289
Household furniture	879,448	1,067,197	1,079,114
Carriages and parts, and railroad cars and parts	476,894	655,600	816,978
Hats of fur or silk	180,714	145,226	118,770
Hats of palm leaf	78,494	71,478	92,832
MANUFACTURES.			
Saddlery	$45,222	$58,870	$71,882
Trunks and valises	87,748	42,153	50,184
Adamantine and other candles	677,898	671,750	708,699
Soap	580,085	466,215	494,405
Snuff	11,526	68,090	11,854
Tobacco, manufactured	1,447,027	3,384,401	3,872,074
Gunpowder	398,244	371,608	467,772
Leather	497,714	499,718	674,309
Boots and shoes	818,995	820,175	782,525
Cables and cordage	286,168	320,485	246,572
Salt	190,699	212,710	129,717
Lead	58,624	28,575	50,446
Iron:			
Pig	58,890	21,218	19,148
Bar	64,596	48,226	88,257
Nails	279,827	188,223	188,754
Castings	289,967	128,659	282,848
Other manufactures of	4,197,687	5,117,846	5,174,040
Copper and brass, and manufactures of	607,054	1,048,246	1,664,122
Drugs and medicines	866,909	796,008	1,115,455
Cotton piece goods:			
Printed or colored	1,785,685	2,820,890	3,856,449
White, other than duck	3,468,230	1,302,881	1,408,506
Duck	252,109	215,855	382,089
All other manufactures of	614,153	4,477,096	5,792,752
Hemp:			
Thread	1,066	444	480
Bags	38,687	5,489	4,788
Cloth	.. .	905	818
Other manufactures of	....	12,090	21,888
Wearing apparel	388,442	470,618	525,175
Earthen and stone ware	84,256	47,261	65,086
Combs and buttons	39,799	46,007	28,845
Brooms and brushes of all kinds	7,324	44,688	61,877
Billiard tables and apparatus	788	12,094	15,679
Umbrellas, parasols, and sunshades	6,846	4,837	4,862
Morocco and other leather not sold by the pound	2,119	41,465	19,011
Fire engines	21,524	8,218	9,948
Printing presses and type	52,747	68,868	157,124
Musical instrum'ts	127,748	151,101	129,658
Books and maps	277,647	319,068	278,268
Paper and stationery	224,767	299,857	285,798
Paints and varnish	228,820	185,068	228,809
Jewelry, real and imitation	28,070	58,858	24,659
Other manufactures of gold and silver, and gold leaf	15,477	85,947	140,187
Glass	179,900	252,316	277,948
Tin	5,622	89,289	89,064
Pewter and lead	4,818	28,782	46,081
Marble and stone	111,408	112,214	176,239
Brick, lime, and cement	68,002	160,611	154,045
India rubber shoes	331,125	52,006	58,826
India rubber other than shoes	312,387	146,821	182,015
Lard oil	92,499	50,978	55,788
Oil cake	1,186,980	1,198,561	1,609,828
Artificial flowers	....	212	207
Coal	616,861	658,536	740,788
Ice	219,816	164,581	188,184
Gold and silver coin	28,777,872	24,172,442	26,083,678
Gold and silver bullion	81,800,980	83,829,868	80,918,178
Quicksilver	665,480	....	258,682
Articles not enumerated:			
Manufactured	3,292,722	2,274,652	2,897,445
Raw produce	1,266,828	1,858,205	1,855,891
Total	$338,985,065	$335,894,385	$373,189,274

TABLE XV.—PRINCIPAL FOREIGN GOODS EXPORTED FROM THE UNITED STATES TO OTHER COUNTRIES DURING THE YEAR ENDING JUNE 30, 1857, 1859, AND 1860.

Species of merchandise.	1857.	1859.	1860.
MERCHANDISE FREE OF DUTY.			
Articles imported from British provinces under the reciprocity treaty..	....	$67,139	$52,147
Bullion:—Gold............	$8,000	80,464	51,181
Silver...........	18,221	82,652	85,098
Coffee and tea from their place of production, in certain vessels:			
Coffee..................	2,609,841	1,818,217	2,265,848
Tea........	1,417,876	2,454,044	1,988,798
Coins:—Gold.............	5,146,801	8,575,284	1,448,007
Silver............	8,891,048	2,696,706	8,065,107
Copper:			
For sheathing vessels....	18,795	24,022	18,821
In bars or pigs..........	....	321,297	104,770
Old.....................	....	7,848	9,652
Ore.....................	54,965	15,668	10,400
Dyewood in sticks........	....	820,500	816,806
Manures:			
Guano..................	50,460	182,665	116,888
Other substances used as	....	40,066	83
Rags of every material except wool............	....	36,202	82,045
Sheathing metal, not wholly or in part of iron, ungalvanized	84,048	29,452	61,291
Silk, raw or reeled from the cocoon	....	19,978	176,589
MERCHANDISE PAYING DUTY.			
Bark, all kinds not otherwise provided for	12,877	161,199	87,883
Beer, ale and porter.......	46,601	70,928	61,865
Watches and parts thereof	11,018	88,758	87,930
Clothing:			
Articles of wear.........	23,172	24,769	69,541
Ready made............	20,995	23,085	88,265
Cocoa....................	52,801	168,432	271,987
Copper, manufactures of, not specified..........	411,511	7,827	1,859
Cordage:			
Tarred and cables.......	30,651	7,705	30,225
Untarred...............	36,452	36,705	11,181
Twine....................	14,012	24,183	27,110
Cotton, manufactures of:			
Piece goods............	305,392	25,668	64,649
Thread, twist, yarn	22,616	1,583	27,618
Not specified...........	228,107	108,582	267,818
Bleached, printed, painted, or dyed piece goods wholly of cotton	....	142,678	465,592
All other manufactures wholly of cotton......	....	52,797	229,761
Extracts and decoctions of logwood and other dyewoods not otherwise provided for..........	878,143	36,445	2,575
Fish:			
Dried or smoked........	152,689	122,446	142,805
Mackerel...............	48,770	20,980	7,291
All other..............	61,126	42,274	48,109
Flax, manufactures of:			
Linens, bleached and unbleached..............	69,525	34,190	119,381
Manufactures of, not specified...	23,405	37,198	61,195
Fruits, green, ripe, or dried:			
Currants...............	6,629	18,502	62,998
Figs...................	25,554	14,568	27,878
Raisins................	39,855	75,594	74,869
Other green, ripe, dried, or preserved fruit.....	55,730	42,039	92,564
Jewelry, real or imitation.	85,633	50,946	9,815
Gunny bags............	84,825	82,274	60,501
Gunny cloth............		82	2,294
Hair, unmanufactured.....	45,844	2,839	25,467
Hats and bonnets of straw or other vegetable substances...............	105,887	97,230	99,484

Species of merchandise.	1857.	1859.	1860.
MERCHANDISE PAYING DUTY.			
Hemp, manufactures of....	$15,868	$31,051	$48,219
" unmanufactured...	97,749	28,593	16,968
Honey...................	208,071	104,420	94,944
India rubber, manufactured	62,593	1,907	144,086
" unmanufactured................	64,491	98,916	300,915
Indigo..................	62,178	10,846	48,175
Iron, iron and steel, and steel, manufactures of:			
Bar iron...............	22,261	8,996	24,905
Cutlery................	12,668	84,701	18,943
Firearms not specified ..	7,290	20,941	6,059
Muskets and rifles	27,277	27,348	14,259
Railroad iron...........	68,103	19,571	15,410
Steel of all kinds.......	27,708	8,079	17,574
Other manufactures of iron.................	834,479	119,104	284,211
Manufactures of steel....	....	26,870	58,314
Jute, Sisal grass, coir, &c..	809,012	96,448	27,148
Lead, and manufactures of.	217,862	57,611	54,086
Matting, Chinese or other, of flags, jute, &c......	30,172	82,098	48,908
Molasses................	510,214	519,888	283,441
Oil:			
Spermaceti............	1,080	950	50,761
Whale and other fish....	860	7,611	89,115
Essential, expressed, or volatile..............	18,688	68,424	140,909
Linseed................	88,745	8,297	[illegible]
Olive..................	44,601	16,762	12,965
Palm and cocoanut........	7,930	14,412	45,688
Opium	20.128	6,145	12,465
Paper, and manufactures of	26,505	36,268	87,004
Quicksilver..............	14,500	88,812	15,890
Raw hides and skins	277,590	506,218	1,671,475
Salt....................	41,218	22,436	96,963
Saltpetre:			
Crude..................	412,769	8,290	6,986
Refined, or partially so..	181,705	40,164	548
Silk, and manufactures of..	161,849	244,444	300,236
Soda ash.................	189,505	4,005	9,057
Spices:			
Cassia.................	40,858	28,115	68,256
Cinnamon..............	16,456	12,768	15,663
Cloves................	35,168	7,159	12,557
Pepper, black..........	102,862	107,418	292,958
Pimento...............	151,578	29,287	86,900
Spirits, foreign distilled:			
Brandy................	141,688	106,883	77,699
From grain............	15,859	35,295	81,592
From other materials ...	42,055	49,406	116,987
Sugar:			
Brown.................	884,598	1,801,959	1,671,497
Loaf, and other refined..	249,658	424,582	473,081
White, clayed, or powdered.................	46,017	6,580	5,785
Tobacco:			
Cigars.................	227,143	226,234	278,668
Other manufactured.....	241,741	12,464	4,314
Unmanufactured........	14,287	565,986	507,604
Wares, china, earthen, porcelain, and stone......	27.029	24,644	27,961
Wine, all kinds...........	149,615	305,796	165,950
Wood, manufactures of....	83,788	19,305	88,756
" unmanufactured....	164,968	58,569	128,278
Wool and worsted, manufactures of...........	437,498	221,306	201,276
Wool, unmanufactured....	....	22,811	80,667
Value of merchandise not enumerated:*			
Paying duties at 4 per ct.	47,595	58,009	69,927
" " 8 "	84,983	6,678	24,513
" " 12 "	1,600	....	4,487
" " 15 "	236,861	529,863	542,118
" " 19 "	15,625	212	27,988
" " 24 "	209,686	211,279	388,977
" " 30 "	10,032	7,581	6,065

Total foreign exports in 1857, $23,975,617; 1859, $20,895,077; 1860, $26,933,022.

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* Under the tariff of 1846 (altered in 1857) the duties on this class were 5, 10, 15, 20, 25, 30, and 40 per cent.

TABLE XVI.—IMPORTS FROM FOREIGN COUNTRIES INTO THE UNITED STATES IN 1857, 1859, 1860.

Articles.	1857.	1859.	1860.
MERCHANDISE FREE OF DUTY.			
Animals, living, of all kinds	$48,845	$705,787	$1,441,665
Argols, or crude tartar.	....	144,999	109,708
Articles imported from British provinces under reciprocity treaty	....	16,884,416	20,446,586
Articles of all kinds for the use of the U. S..	....	44,792	6,108
Articles of U. S. produce brought back	1,201,476	1,440,497	1,157,625
Articles for the library of congress	....	615	8,855
Articles specially imported for use of seminaries of learning	61,074	34,761	55,899
Articles in a crude state used in dyeing or tanning	....	174,829	198,095
Bark, Peruvian	....	815,292	449,575
Bells, old, & bell metal.	....	109	289
Berries, nuts, &c., including nutgalls, and some other articles used in dyeing	....	76,062	50,168
Bismuth	....	4,771	5,786
Bitter apples	....	1,606	1,518
Bolting cloths	...	76,257	89,554
Bone black	....	960	834
Bone, burnt	....	....	28,336
Bone dust	....	....	15,825
Brass	....	13,465	17,980
Bullion:			
Gold	151,585	741,608	493,187
Silver	885,114	823,478	499,943
Buhr stones	....	56,788	67,247
Cabinets of coins, medals, &c.	247	886	273
Coffee from its places of production, in certain vessels	22,836,879	25,063,833	21,768,989
Tea from its places of production, in certain vessels	5,757,860	7,306,916	8,808,771
Coins:			
Gold	6,503,051	1,383,789	2,015,599
Silver	5,472,049	4,985,914	5,541,406
Copper:			
For sheathing vessels	851,811	156,891	87,577
In bars or pigs	....	801,482	196,996
Old	....	124,006	291,027
Ore	1,440,814	1,846,501	1,081,493
Cotton, unmanufactured	62,172	52,045	140,387
Dragon's blood	....	356	255
Dyewoods in sticks	....	729,596	838,186
Effects:			
Personal and household	....	39,333	54,489
Personal, of emigrants and others, including wearing apparel, tools of trade, &c..	....	222,978	194,287
Household, of persons or families arriving in the U. S.	....	70,272	100,516
Personal and household, of U.S. citizens dying abroad	413,780	841	3,686
Felt, adhesive, for sheathing vessels	20,156	56,490	46,549
Flax, unmanufactured.	....	146,707	218,687
Glass, old	....	301	718
Hair of the alpaca, goat, &c.	....	....	14
Ivory, unmanufactured.	....	874,087	513,421
Linseed (not embracing flaxseed)	....	2,415,248	2,758,411
Madder, root	....	44,138	85,911
" ground or prepared	....	2,156,403	784,671
Manures:			
Guano	279,026	429,685	525,307
Other substances used as	....	2,258	572
Maps and charts	....	6,969	7,150
MERCHANDISE FREE OF DUTY.			
Models of inventions and improvements	$2,997	$762	$6,895
Oils, fish	....	591,901	642,077
Other products of fisheries	....	189,817	112,040
Old junk and oakum	55,459	82,882	112,208
Paintings and statuary..	98,002	368,816	554,754
Palm leaf, unmanufactured	....	80,674	99,557
Plaster of Paris, do.	90,168	78,996	99,423
Platinum, do.	58,714	68,006	64,572
Rags of every description except wool	....	1,876,777	1,540,244
Rattans and reeds, unmanufactured	....	400,815	118,122
Seeds, trees, shrubs, bulbs, plants, &c., not otherwise provided for	336,504	573,889	448,309
Sheathing metal not wholly or in part of iron, ungalvanized..	748,872	876,996	845,151
Shingle bolts and stave bolts	....	10,109	14,798
Silk, raw or reeled from the cocoon	....	1,330,890	1,235,976
Specimens of natural history, &c.	8,240	4,420	9,405
Tin bars	....	457,082	90,594
" blocks	....	415,308	8,228
" pigs	....	167,446	1,086,777
Wool, sheep's, unmanufactured, in value not exceeding 20 cts. per lb.	....	4,363,121	4,450,658
All other articles exempt from duty	20,781,411	486,102	223,810
MERCHANDISE PAYING DUTY.			
Acids:			
Acetic, benzoic, boracic, citric, muriatic, &c.	78,271	237,302	285,251
Acetous, chromic, nitric, &c.	....	14,040	16,948
Alum	24,536	84,808	54,308
Arrowroot	25,751	41,286	18,908
Barilla	81,018	9,841	10,088
Bark:			
Quilla	886,252	759	50
Of all kinds not otherwise provided for..	258,605	1,845	8,632
Beer, ale, and porter:			
In casks	221,290	188,224	102,569
In bottles	628,550	632,975	688,201
Black lead pencils	88,089	129,812	182,899
Boots and shoes, other than leather	80,525	22,077	29,808
Borax, refined	94,844	101,515	57,162
Brass:			
Pins	68	50,161	49,224
Wire	4,868	160	2,877
Manufactures of, not specified	218,081	186,139	180,191
Breadstuffs:			
Barley	8,068	12,159	8,898
Indian corn and corn meal	....	47,218	29,051
Oats	110	1,818	2,978
Oatmeal	559	2,781	8,401
Rye	2,070	140	57
Wheat	909	36,824	10,138
Wheat flour	477	12,097	932
Brimstone, crude	152,830	324,176	894,896
" rolled	12,805	10,741	12,549
Bristles	289,581	222,179	437,450
Brushes and brooms	283,968	231,781	823,822
Butter	18,654	4,060	338
Buttons, metal	18,178	15,462	25,402
All other buttons and moulds	912,871	715,670	640,229
Camphor, crude	56,814	82,959	6,318
" refined	84	19	209
Candles, stearine	62,187	8,797	12,176
" tallow	....	230	11

TABLE XVI.—IMPORTS FROM FOREIGN COUNTRIES INTO THE UNITED STATES—*Continued.*

Articles.	1857.	1858.	1860.
MERCHANDISE PAYING DUTY.			
Candles, wax	$9,667	$5,088	$5,791
Cheese	143,821	155,685	168,437
Chloride of lime or bleaching powder	....	365,963	437,797
Chronometers, box or ship's, and parts of	16,442	7,921	4,084
Clocks, and parts of	79,147	71,885	96,529
Watches, and parts of	3,823,039	2,809,387	2,738,671
Watch materials and unfinished parts of watches	....	86,845	101,931
Clothing, articles of wear	1,571,517	1,252,485	1,756,287
" ready made	847,471	284,849	346,059
Coal	772,663	988,200	839,834
Cochineal	440,707	498,981	225,355
Cocoa	187,016	369,339	333,242
Copper bottoms	4,390	6,091	1,006
Copper:			
Nails and spikes	1,728	358	187
Wire	681	5,278	602
Manufactures of, not specified	1,827,382	109,443	21,576
Cordage, tarred, and cables	92,099	49,188	98,386
Cordage, untarred	64,483	12,079	34,341
Seines	59,957	1,582	780
Twine		54,874	49,238
Cotton, manufactures of:			
Cords, galloons, gimps	218,824	25,570	55,862
Hatters' plush of cotton and silk	11,478	9,395	63,965
Hosiery and articles made on frames	3,210,287	3,228,036	4,310,859
Piece goods	21,441,082	17,349,497	27,098,211
Thread, twist, yarn	1,401,153	1,918,417	1,775,314
Velvets	678,294	888,712	868,774
Manufactures not specified	1,729,613	2,383,955	2,401,526
All other manufactures wholly of cotton	....	1,106,499	1,485,008
Daguerreotype plates	10,968	14,168	15
Dolls and toys of all kinds	....	852,899	472,907
Engravings or plates	182,369	182,844	120,790
Extracts and decoctions of logwood and other dyewoods not otherwise provided for	....	28,791	25,817
Extract of madder	1,875,472	152,808	585,698
Extract of indigo	....	1,050	1,824
Feathers and flowers, artificial and ornamental	....	741,438	776,748
Fish:			
Dried or smoked	96,607	107,615	149,217
Herrings	49,213	38,908	38,808
Mackerel	144	6,661	258
Salmon	8,949	6,361	111
All other dried and smoked fish	4,633	8,673	4,990
Sardines, and all other fish in oil	....	251,278	299,679
Flax, manufactures of:			
Hosiery and articles made on frames	6,912	26,529	35,526
Linens, bleached or unbleached	9,975,838	8,958,977	9,245,316
Linen manufactures not specified	1,459,292	1,355,009	1,454,993
Tow of flax, codilla	220,738	179	458
Flaxseed	....	549	649
Floor cloth, patent, painted, &c.	9,524	8,385	8,253
Fruits:			
Currants	151,418	319,326	284,642
Dates	17,048	91,060	67,605
Figs	212,207	140,282	362,369
Lemons	640,544	313,160	423,220
Limes		1,588	6,852
Oranges		644,683	753,695
Plums	118,059	169,197	220,284
Prunes	108,994	193,297	276,939
Raisins	937,460	1,420,980	1,475,879
Other green, ripe, or dried fruit	151,587	227,881	234,124

Articles.	1857.	1858.	1860.
MERCHANDISE PAYING DUTY.			
Fruit preserved in sugar, brandy, &c.	$102,557	$120,977	$160,827
Furs:			
Dressed, on the skin	214,405	150,076	195,171
Undressed, on the skin	518,793	366,722	297,414
Hatters', dressed or undressed, not on the skin	1,572,888	2,448,197	1,223,611
Manufactures of	49,955	91,996	122,437
Glass:			
Bottles	39,225	38,780	87,155
Demijohns	30,399	34,262	33,479
Crystals for watches	32,170	26,944	33,555
Painted or colored	38,783	41,743	53,597
Polished plate	525,061	350,561	440,129
Porcelain	....	2,882	15,689
Silvered	243,762	290,198	427,290
Wares, cut	112,940	99,828	116,590
" plain	79,788	66,006	95,869
Window, broad crown or cylinder	641,093	696,566	755,167
Manufactures of, not specified	142,904	185,941	166,048
Glaziers' diamonds	898	2,247	906
Glue	23,571	21,578	26,589
Gold and silver, manufactures of:			
Epaulets, galloons, laces, tassels, &c.	40,438	54,417	62,288
Gems, set	4,437	12,822	19,231
" not set	890,857	862,985	929,969
Leaf	29,509	78,290	75,098
Jewelry, or imitations of	503,658	480,388	526,95
Silver-plated metal	1,993	1,296	829
" " wire	2,948	26,208	43,186
Manufactures of, not specified	78,181	41,501	43,718
Grass cloth	43,504	9,917	7,441
Gum Arabic, Barbary, copal, &c.	143,380	371,876	297,674
All other gums and resins in a crude state	456,432	282,185	196,969
Gunny bags	2,189,798	316,806	257,887
Gunny cloth		1,302,060	1,795,256
Gunpowder	9,653	4,042	2,140
Gutta percha:			
Manufactures of	....	1,688	494
Unmanufactured	....	12,455	916
Hair:			
Manufactures of	129,571	111,958	97,615
Unmanufactured	458,705	378,050	391,768
Angora, Thibet, &c., piece goods	508,993	618,248	909,371
Do., unmanufact'd	575	52,892	1,219
Hats and bonnets of straw and other vegetable substances	2,246,928	1,118,810	1,608,289
Hats of hair, whalebone, or other materials, not otherwise provided for	....	32,755	44,047
Hemp, and manufactures of:			
Burlaps	130,864	106,396	77,610
Cotton bagging	14,069	24,202	12,256
Osnaburgs and Ticklenburgs	....	768	595
Sail duck	14,180	3,857	20,903
Manufactures of, not specified	360,469	297,998	657,520
Unmanufactured	423,583	405,178	825,346
Tow of hemp, codilla	92,520	18,719	7,957
Honey	202,436	196,751	163,027
India rubber:			
Manufactured	180,585	190,314	248,296
Unmanufactured	832,058	971,459	1,426,256
Indigo	1,010,509	1,441,429	1,418,790
Ink and ink powders	47,784	86,723	49,118
Iron, and iron and steel, manufactures of:			
Anchors, and parts of	82,980	13,510	9,904
Anvils, and parts of	67,926	50,806	47,594
Bar iron	4,428,985	4,194,931	4,473,666
Cables, chain	293,124	174,701	190,569
Cutlery	2,140,824	1,762,106	2,240,905

TABLE XVI.—IMPORTS FROM FOREIGN COUNTRIES INTO THE UNITED STATES—*Continued.*

Articles.	1857.	1859.	1860.
MERCHANDISE PAYING DUTY.			
Iron, and iron and steel, manufactures of:			
Firearms not specified	$541,175	$314,519	$342,642
Hoop iron	824,675	887,198	518,087
Muskets and rifles	61,170	16,851	20,889
Nails, spikes, tacks, &c.	188,756	84,804	122,936
Needles	250,820	254,794	336,559
Old and scrap iron	111,680	107,702	108,227
Pig iron	1,001,742	1,049,200	1,005,865
Railroad iron	7,455,596	2,274,082	3,709,876
Rod iron	809,901	832,801	576,720
Saws, mill, cross-cut, and pit	47,297	26,495	7,485
Sheet iron	1,082,889	752,975	839,065
Side arms	5,294	5,716	11,043
Steel, cast, shear, and German	1,775,292	1,141,871	1,580,897
All other steel	858,822	905,859	1,198,456
Wire, cap or bonnet	6,168	14,299	11,465
Other manufactures of iron not specified	4,475,545	2,150,625	2,682,888
All other manufactures of steel	....	1,048,405	1,606,481
Ivory, manufactures of	524,722	15,456	14,094
Ivory black	289	....	859
Jute, Sisal grass, coir, &c.	834,828	2,157,895	1,820,137
Laces, &c.:			
Braids of cotton	....	41,785	48,674
Embroideries of cotton, linen, silk, and wool	4,443,175	3,286,408	2,968,616
Insertings of cotton	821,961	19,886	15,954
" " thread		2,298	8,558
Laces of cotton	1,129,754	855,880	474,648
" " thread		278,999	898,984
Trimmings of cotton		204,299	117,246
Lard	420	54	278
Lasting and mohair cloth for buttons and shoes	99,084	111,760	194,010
Lead:			
Bar, pig, sheet, and old	2,805,768	2,617,770	1,885,868
Pipes	128	850	4,148
Shot	15,487	2,677	6,231
Manufactures of, not specified	2,076	844	780
Leather:			
Boots and shoes	127,651	123,666	184,476
Gloves	1,559,882	1,837,998	1,548,429
Japanned, or skins, of all kinds	....	226,022	149,208
Skins tanned and dressed	809,273	1,994,777	1,120,481
Skivers	68,194	120,978	157,862
Tanned band, sole, and upper	1,606,458	2,858,794	1,454,687
Manufactures of, not specified	459,161	886,722	551,605
Licorice paste	892,552	512,529	561,812
" root	42,091	41,569	74,722
Machinery exclusively designed and expressly imported for the manufacture of flax and linen goods	....	17,891	4,602
Marble, manufactures of	25,253	27,750	38,828
" unmanufactured	201,978	171,758	228,416
Mathematical instruments	84,925	18,975	18,950
Matting, Chinese or other, of flags, jute, &c.	207,587	263,133	303,461
Meats and vegetables:			
Bacon	7,204	701	463
Beef	2,614	8,081	577
Ham	....	11,496	15,557
Pork	....	1,840	841
Potatoes	87,572	94,878	50,962
Meats, game, poultry, and vegetables, prepared in cans, &c.	....	47,497	80,685
Molasses	8,259,175	5,062,850	5,216,327
Musical instruments	494,874	898,715	489,952
MERCHANDISE PAYING DUTY.			
Nuts:			
Almonds	$209,605	$444,757	$247,025
Cocoanuts	....	48,564	45,718
Not otherwise provided for	183,144	177,849	286,568
Oil and bone of foreign fishing:			
Spermaceti	418	....	144
Whale and other fish	17,280	3,504	41,759
Whalebone	252	888	345
Oil:			
Castor	102,502	188,186	139,647
Essential, expressed, or volatile	146,872	808,126	258,774
Hemp seed and rape seed	17,601	18,848	23,866
Linseed	958,200	695,172	402,968
Neatsfoot and other animal oils	158	656	198
Olive, in casks	74,028	146,485	75,580
" " bottles	847,896	889,490	873,141
Palm and cocoanut	887,881	453,588	599,855
Oil cloth of all kinds	9,524	27,948	26,787
Opium	468,452	804,910	540,548
Paints, &c.:			
Litharge	17,721	10,665	7,578
Ochre, dry	16,258	17,578	26,465
Painters' colors	....	61,702	108,658
Paris white	....	11,728	11,252
Red lead	118,075	97,217	71,710
Sugar of lead	55,795	88,810	22,628
Water colors	....	85,447	25,544
White lead	....	119,101	98,495
Whiting	29,169	14,950	13,682
Not specified	....	801,180	855,828
Paper and manufactures of:			
Blank books	18,884	18,465	18,770
Paper boxes	86,900	10,288	12,878
Fancy boxes		19,222	17,590
Playing cards	17,281	18,105	19,238
Paper hangings	254,591	148,722	144,400
Papier maché goods	83,948	16,218	19,884
Sheathing paper	....	....	256
Writing paper	848,240	164,929	299,915
Not specified	178,228	282,876	191,382
Parchment	5,750	5,150	5,528
Pens, metallic, &c.	164,771	114,817	106,147
Pewter, old	8,874	784	641
" manufactures of, not specified	570	1,605	604
Printed books in English	668,597	427,280	599,670
" " " other languages	179,064	261,925	195,811
Newspapers, illustrated	30,497	24,844	29,498
Periodicals		1,221	1,951
Periodicals in course of republication	326	....	86
Quicksilver	961	98,217	16,742
Raw hides and skins	10,010,090	13,011,826	10,524,706
Saddlery, common, tinned, or japanned	82,781	59,658	78,419
Saddlery, plated, brass, or polished steel	195,164	138,814	177,088
Salt	2,082,583	1,295,584	1,481,140
Saltpetre, crude	1,156,463	864,482	1,086,972
" refined	862	49,986	13,185
Silk:			
Caps, bonnets, and hats	151,192	89,158	95,529
Floss	30,612	14,825	12,908
Hosiery, &c.	839,299	460,084	546,845
Piece goods	22,067,869	21,182,188	24,876,075
Do. of silk and worsted	1,580,246	1,623,106	2,198,876
Raw	953,784	288,267	104,700
Sewing	211,728	171,683	154,572
Twist	....	75,539	80,414
Manufactures of, not specified	4,442,522	4,463,883	5,001,406
Slates of all kinds	96,176	92,088	205,244
Soap, perfumed	51,507	75,777	62,437
" not perfumed	189,926	898,758	183,516
Soda ash	1,084,021	1,708,444	1,801,980
" carbonate	424,024	823,464	569,001
" sal	86,488	218,140	170,805

TABLE XVI.—IMPORTS FROM FOREIGN COUNTRIES INTO THE UNITED STATES—*Continued.*

Articles.	1857.	1859.	1860.
MERCHANDISE PAYING DUTY.			
Spices:			
Cassia	$201,883	$209,600	$245,695
Cinnamon	18,865	15,836	8,727
Cloves	65,332	45,807	26,970
Ginger, ground	32	7,201	6,899
" dried, green, ripe, preserved, or pickled	44,123	64,244	65,859
Mace	26,754	16,478	12,895
Nutmegs	254,637	865,480	186,212
Pepper, black	279,287	401,791	487,218
" red	2,460	8,130	5,022
Pimento	241,503	118,688	82,445
Spirits:			
Brandy	2,527,262	8,262,058	8,938,041
From grain	1,125,160	1,465,243	1,211,885
From other materials	218,907	444,207	850,228
Cordials	92,396	188,178	169,071
Starch	6,695	8,968	1,400
Sugar:			
Brown	42,614,604	80,471,802	80,959,985
Candy	1,887	1,248	8,185
Loaf and other refined	68,906	8,087	58,580
Sirup of sugar cane	4,284	19,717	5,589
White, clayed, or powdered	86,820	78,229	59,816
Sulphate of barytes	48,567	22,502	40,017
" of quinine	249,964	6,542	8,617
Tallow	12,507	9,577	18,129
Coffee from places other than those of its production	39,879	22,696	114,858
Tea, do.	17,315	81,825	111,556
Tin:			
Foil	21,426	26,401	87,008
Plates and sheets	4,789,588	5,881,147	4,631,655
Manufactures of, not specified	1,055,182	28,688	26,939
Tobacco, manufactured:			
Cigars	4,221,096	4,581,742	4,581,559
Snuff	2,626	5,006	7,110
Other manufactures of	18,898	46,712	125,615
Unmanufactured	1,858,885	1,686,118	1,365,625
Umbrellas, parasols, and sunshades of silk and other	65,860	67,420	68,882
Verdigris	9,690	89,478	82,820
Vitriol:			
Blue (sulph. copper)	5,884	5,899	8,220
Green (sulph. of iron)	6,446	9,268	19,077
Oil of (sulphuric acid)	98	58	27
White (sulph. zinc)	....	....	....
Wares, china, &c.:			
Chemical, earthen, or pottery, capacity exceeding 10 gallons	....	17,818	19,974
China, earthen, porcelain, and stone	4,037,064	8,416,714	4,887,888
Britannia	8,984	7,966	1,858
Gilt or plated	160,824	122,078	181,728
Japanned	46,388	25,678	80,125
Wines, in casks:			
Austrian and other German	27,259	116,478	118,985
Burgundy	21,627	17,782	23,881
Claret	669,408	524,028	809,785
Fayal and other Azores	4,704	88	2,404
Madeira	65,880	52,902	63,838
Port	407,564	88,217	214,925
Sherry and St. Lucas	364,906	262,849	481,287
Sicily and other Mediterranean	138,894	87,099	86,895
Teneriffe and other Canary	565	178	280
Red, not enumerated	500,527	288,677	486,999
White, " "	252,584	299,121	462,415
Wines, in bottles:			
Burgundy	7,064	8,788	7,048
Champagne	1,148,469	1,885,760	1,845,925
Claret	865,807	262,682	420,475
Madeira	2,734	1,702	7,275

Articles.	1857.	1859.	1860.
MERCHANDISE PAYING DUTY.			
Wines, in bottles:			
Port	$16,837	$14,458	$15,072
Sherry	11,139	11,743	9,008
All other	273,242	240,616	320,257
Woad or pastel	1,201	2,056	1,495
Wood:			
Cabinet and household furniture	47,696	43,171	50,689
Cedar, manufactured		8,214	22
Ebony, "		621	598
Mahogany, "	15,185	14,000	8,720
Rosewood, "		9,480	9,027
Satinwood, "		66	103
Willow, "	175,484	125,677	143,495
Other manufactures of	891,179	240,522	297,798
Cedar, unmanufactured		84,796	80,238
Box, do.		2,993	295
Ebony, do.		4,888	7,348
Granadilla, do.		7,790	5,340
Lignum vitæ, do.	518,251	12,507	7,353
Mahogany, do.		263,625	327,770
Rosewood, do.		148,971	226,453
Satinwood, do.		....	2,923
All other cabinet, do.		10,382	1,114
Firewood	....	88	133
Willow	41,778	38,359	39,556
Other, not specified	29,457	670	8,702
Cork bark, manufactures of	....	....	59
Corks	209,572	167,892	260,923
Cork bark, unmanufactured	17,692	34,174	52,857
Wool:			
Baizes, bindings, and bockings, of wool or worsted	119,835	136,174	200,683
Blankets	1,680,973	1,697,886	1,665,181
Carpeting	2,181,290	2,200,164	2,542,523
Flannels	105,779	101,911	178,890
Hosiery and articles made on frames	1,740,829	719,415	881,627
Piece goods, including wool and cotton	11,009,605	11,259,693	12,757,754
Piece goods of worsted including worsted and cotton	11,565,669	12,289,574	15,018,351
Shawls of wool, wool and cotton, silk, and silk and cotton	2,246,351	2,877,352	2,806,957
Woollen and worsted yarn	192,147	386,824	593,371
Wool or worsted, manufactures of, not specified	693,640	1,853,463	1,311,573
Wool, unmanufactured, not otherwise provided for	....	81,833	891,494
Zinc:			
Nails	2,453	878	1,602
Pigs	44,764	117,420	20,873
Sheets	546,250	556,155	504,744
Spelter	447,812	657,986	276,853
Manufactures of, not specified	....	673	757
Value of merchandise not specified in the above statements:*			
At 4 per cent. duty	1,347,024	2,486,685	2,124,564
At 8 per cent	646,016	410,674	445,256
At 12 per cent	1,698	12,268	10,525
At 15 per cent	8,604,767	8,389,108	8,215,398
At 19 per cent	183,493	154,976	135,452
At 24 per cent	2,624,645	1,564,621	1,786,999
At 30 per cent	541,815	82,378	59,911
Paying duties	$294,160,835	$259,047,014	$279,874,640
Free of duty	66,729,306	79,721,116	82,291,614
Total	$360,890,141	$338,768,130	$362,166,254

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* The duties on these unenumerated articles, under the tariff of 1846, which was in effect in the year ending June 30, 1857, were respectively 5, 10, 15, 20, 25, 30, and 40 per cent.

Table XVII.—Commerce of the United States with Foreign Nations in 1850 and 1860.*

Foreign States and Countries.	Value of exports.						Value of imports.	
	Domestic products.		Foreign products.		Total.			
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
European Russia	$666,435	$2,713,766	$198,506	$30,453	$864,941	$2,744,219	$1,511,572	$1,582,190
Asiatic Russia		29,268		13,348		42,616		12,974
Russia in America		11,148		35,342		46,490		12,704
Prussia	70,645	....	27,991	....	98,636	....	27,469	36,464
Sweden and Norway	668,580	1,416,741	51,610	2,386	720,190	1,419,127	1,032,117	514,191
Swedish West Indies	98,176	97,135	1,166	83	99,342	97,218	2,193	18,793
Denmark	165,874	65,124	20,706	....	186,580	65,124	527	16,509
Danish West Indies	867,140	1,219,289	114,818	44,135	981,958	1,263,424	267,459	200,416
Hamburg	4,320,780	4,297,272	885,742	2,768,554	5,206,522	7,065,826	8,787,874	9,827,793
Bremen		10,504,219		808,663		11,312,882		8,670,814
Lübeck		....		....		....		....
Other German ports	....	46,991	....	2,259	....	49,250	....	....
Holland	2,188,101	3,762,413	416,564	209,918	2,604,665	3,972,331	1,686,967	2,869,959
Dutch West Indies	364,335	294,665	56,683	8,766	421,018	303,431	530,146	396,644
Dutch Guiana	97,014	284,009	5,425	37,907	102,439	321,916	71,043	351,895
Dutch East Indies	180,533	181,840	262,952	88,220	443,485	270,060	444,404	882,808
Belgium	2,168,357	2,770,293	375,403	1,789,455	2,543,760	4,559,748	2,404,954	2,558,873
England	64,686,959	187,095,952	4,210,271	5,831,248	68,897,230	192,927,200	72,118,971	133,065,571
Scotland	3,021,740	4,867,218	183,679	137,206	3,205,419	5,004,424	2,746,670	4,607,187
Ireland	1,025,031	4,297,586	42,693	111,711	1,067,724	4,489,297	293,783	923,726
Gibraltar	186,307	920,072	60,482	113,520	246,789	1,033,592	44,269	65,963
Malta	75,329	58,699	39,051	3,047	114,380	61,746	11,354	36,001
British West Indies	3,612,802	5,225,124	178,644	143,355	3,791,446	5,368,479	1,126,968	1,934,549
Canada	4,641,451	11,164,590	1,289,370	2,918,524	5,930,821	14,083,114	4,285,470	18,861,673
British Honduras	171,984	325,181	16,551	19,272	188,535	344,453	178,690	347,108
Other British N. Am. poss.	3,116,840	7,502,839	501,374	1,120,375	3,618,214	8,623,214	1,858,992	4,989,708
British Guiana, &c.	502,776	1,035,204	22,663	2,916	525,439	1,038,120	15,038	360,775
British poss. in Africa	143,219	626,282	....	7,259	143,219	633,541	72,206	1,900,182
British Australia	....	4,069,590	....	49,697	....	4,119,287	....	128,800
British East Indies	502,613	1,111,697	156,846	128,953	659,459	1,240,650	2,865,016	10,692,342
France on the Atlantic	16,934,791	57,840,357	1,724,915	3,004,559	18,659,706	60,844,916	25,835,170	39,450,865
France on the Med'ranean	1,015,486	1,207,874	158,155	153,488	1,173,641	1,361,362	1,702,855	3,768,684
French N. Am. possess.	2,517	109,291	....	31,220	2,517	140,521	....	144,473
French West Indies	269,377	467,517	18,291	76,714	287,668	544,231	75,684	18,353
French Guiana	43,405	86,794	1,382	6,660	44,787	93,454	12,551	27,252
French poss. in Africa	....	65,123	....	590	....	65,713	....	....
French East Indies	12,575	....	2,200	....	14,775	....	10,005	....
Spain on the Atlantic	605,659	1,027,582	28,558	15,913	634,217	1,043,495	380,181	651,594
Spain on the Mediterran'n	3,256,362	5,407,735	96,855	28,070	3,353,217	5,435,805	1,702,214	2,390,457
Canary Islands	20,524	79,426	5,065	975	25,589	80,401	85,223	18,886
Philippine Islands	16,817	368,209	1,450	73,265	18,267	441,474	1,336,866	2,886,166
Cuba	4,530,256	11,747,913	460,041	634,956	4,990,297	12,382,869	10,292,398	34,032,276
Porto Rico	816,062	1,517,837	93,591	263,913	909,653	1,781,750	2,067,866	4,512,985
Portugal	172,978	266,704	5,236	6,285	178,214	272,989	339,763	146,813
Madeira	136,874	34,708	6,527	20	143,401	34,728	114,729	28,778
Cape de Verd Islands	47,043	40,293	2,167	849	49,210	41,142	....	51,825
Azores	14,421	51,016	2,152	2,428	16,573	53,444	16,328	44,029
Sardinia	170,764	4,064,316	86,136	92,229	256,900	4,156,545	205	355,551
Tuscany	45,664	134,944	23,468	4,480	69,132	139,424	....	1,985,501
Papal States	....	266,758	....	....	....	266,758	....	8,889
Two Sicilies	....	484,190	....	26,458	....	510,648	....	2,384,577
Austria	1,179,893	886,950	312,111	151,794	1,492,004	1,038,744	467,601	732,645
Austrian Italy		....		160		160		....
Italy generally	1,617,743	....	252,928	....	1,870,671	....	2,927,706	....
Ionian Republic	....	....	....	....	....	....	....	62,897
Greece	....	....	....	....	....	....	....	71,754
Turkey in Europe	204,397	477,347	53,344	11,687	257,741	489,034	801,023	28,083
Turkey in Asia		305,734		55,000		360,734		942,167
Egypt	...	36,420	....	....	....	36,420	....	71,709
Other ports in Africa	730,932	2,228,177	28,334	142,366	759,266	2,370,543	524,722	1,755,916
Hayti	1,211,007	2,441,905	139,181	231,777	1,350,188	2,673,682	1,544,771	2,002,723
St. Domingo		156,054		13,246		169,300		283,098
Mexico	1,498,791	3,338,739	514,036	2,015,334	2,012,827	5,354,073	2,135,366	6,935,872
Central America	57,225	121,534	12,967	28,164	70,192	149,698	261,459	331,258
New Granada	970,619	1,642,800	285,600	152,699	1,256,219	1,795,499	591,992	3,843,568
Venezuela	678,462	1,056,250	340,008	91,650	1,018,470	1,147,900	1,920,247	2,883,464
Brazil	2,723,767	5,945,235	473,347	335,020	3,179,114	6,280,255	9,324,429	21,214,803
Uruguay	60,024	661,326	1,518	128,032	61,542	789,358	....	908,750
Buneos Ayres and Ar. Rep.	718,331	729,006	346,311	270,702	1,064,642	999,708	2,653,877	4,020,848
Chili	1,297,133	2,845,225	125,588	423,448	1,422,721	3,268,673	1,796,877	2,072,912
Peru	258,939	869,781	....	117,891	275,728	987,672	170,753	308,452
Ecuador	24,414	19,545	16,789	....	34,925	19,545	4,618	....
Sandwich Islands	....	637,489	10,511	109,973	....	747,462	64,476	367,859
Other Isl'ds in the Pacific	....	58,277	....	6,997	....	65,274	....	112,401
Japan	....	89,856	....	48,918	....	138,774	....	55,091
China	1,485,961	7,170,784	119,256	,735,334	1,605,217	8,906,118	6,593,462	13,566,587
Other parts of Asia	315,463	97,442	13,321	11,527	328,784	108,969	402,599	49,634
Whale fisheries	169,025	110,604	20,837	1,659	189,862	112,263	....	595,922
Uncertain places	90,190	....	50,442	....	140,632	....	96,102	168,330
Total	$136,946,912	$373,189,274	$14,951,808	$26,933,022	$151,898,720	$400,122,296	$178,138,318	$362,166,254
Carried in Am. bottoms	$89,616,742	$262,586,577	$9,998,299	$16,496,325	$99,615,041	$279,082,902	$139,657,043	$228,164,855
" " foreign do.	47,330,170	110,602,697	4,953,509	10,436,697	52,283,679	121,039,394	38,481,275	134,001,399

* See tables XIX. and XX. for the commerce of the several states, and table XXI. for that with Canada before and since the reciprocity treaty.

TABLE XVIII.—VALUE OF MANUFACTURED ARTICLES OF DOMESTIC PRODUCE

	Articles.	1847.	1848.	1849.	1850.	1851.	1852.
1..	Wax	$161,527	$134,577	$121,720	$118,065	$122,835	$91,499
2..	Refined sugar	124,824	253,900	129,001	285,066	219,588	149,921
3..	Chocolate	1,653	2,207	1,941	2,260	3,255	3,267
4..	Spirits from grain	67,781	90,957	67,129	48,314	86,064	48,737
5..	Spirits from molasses	293,609	269,467	288,452	268,290	289,622	323,941
6..	Spirits from other materials	.....	.....	.....	.....	.....	.....
7..	Molasses	20,959	5,563	7,442	14,137	16,830	12,163
8..	Vinegar	9,526	18,920	14,036	11,182	16,915	12,229
9..	Beer, ale, porter, and cider	68,114	78,071	51,320	52,521	57,975	48,062
10..	Linseed oil and spirits of turpentine	498,110	331,404	148,056	229,741	145,410	152,537
11..	Lard oil	.....	.....	.....	.....	.....	.....
12..	Household furniture	225,700	297,358	237,342	278,025	362,830	430,182
13..	Coaches and other carriages	75,869	89,963	95,923	95,722	199,421	172,445
14..	Hats	59,536	55,493	64,967	68,671	103,768	80,453
15..	Saddlery	13,102	27,435	37,276	20,893	30,100	41,987
16..	Tallow candles and soap, and other candles	606,798	670,223	627,280	664,963	609,782	680,054
17..	Snuff and tobacco	658,950	568,435	613,044	648,832	1,143,547	1,316,622
18..	Leather, boots, and shoes	243.816	194,095	151,774	193,598	458,838	428,786
19..	Cordage	27,054	29,911	41,636	51,357	52,054	62,908
20..	Gunpowder	88,397	125,263	131,297	190,352	154,257	121,580
21..	Salt	42,333	73,274	82,972	75,103	61,424	89,316
22..	Lead	124,981	84,278	30,198	12,797	11,774	32,725
	Iron :						
23..	Pig, bar, and nails	168,817	154,036	149,358	154,210	215,652	118,656
24..	Castings,	68,889	83,188	60,175	79,318	164,425	191,388
25..	All manufactures of	929,778	1,022,408	886,639	1,677,792	1,875,621	1,993,807
26..	Copper and brass, manufactures of	64,980	61,468	66,203	105,060	91,871	103,039
27..	Medicinal drugs	165,793	210,581	220,894	334,789	351,585	263,852
	Cotton piece goods :						
28..	Printed or colored	290,114	353,534	469,777	606,631	1,006,561	926,404
29..	Uncolored	3,345,902	4,866,559	3,955,117	3,774,407	5,571,576	6,139,391
30..	Twist, yarn, and thread	108,132	170,633	92,555	17,405	37,260	34,718
31..	Other manufactures of	338,375	327,479	415,680	335,981	625,808	571,638
	Hemp and flax :						
32..	Cloth and thread	477	495	1,009	1,183	1,647	5,408
33..	Bags and all manufactures of	5,305	6,218	4,549	10,593	6,376	8,154
34..	Wearing apparel	47,101	574,834	75,945	207,632	1,211,894	250,228
35..	Earthen and stone ware	4,758	8,512	10,632	15,644	23,096	15,330
36..	Combs and buttons	17,026	16,461	38,136	23,987	27,384	28,533
37..	Brushes and brooms	2,967	2,160	2,924	2,827	8,257	4,385
38..	Billiard tables and apparatus	615	12	701	2,295	1,798	1,098
39..	Umbrellas, parasols, and sunshades	2,150	2,916	800	3,395	12,260	8,340
40..	Manufactures of India rubber	.....	.....	.....	.....	.....	.....
41..	Leather and morocco (not sold per pound)	29,856	16,483	9,427	9,800	13,309	18.617
42..	Fire engines and apparatus	3,443	7,686	548	3,140	9,488	16,784
43..	Printing presses and types	17,431	30,403	28,031	39,242	71,401	47.781
44..	Musical instruments	16,997	38,508	28,713	21,634	55,700	67.738
45..	Books and maps	44,751	75,193	94,427	119,475	153,912	217.800
46..	Paper and stationery	88,731	78,307	86,827	99,696	155,664	119,535
47..	Paints and varnish	54,115	50,739	55,145	67,597	109,834	85.309
48..	Manufactures of glass	71,155	76,007	101,419	136,682	185.436	194,604
49..	Manufactures of tin	6,368	12,353	13,143	13,590	27,823	23.429
50..	Manufactures of pewter and lead	18,694	7,739	13,196	22,682	16,426	18,400
51..	Manufactures of marble and stone	11,220	22,466	20,282	34,510	41,449	57,309
52..	Manufactures of gold and silver, and gold leaf	4,268	6,241	4,502	4,583	68,639	20,333
53..	Quicksilver	.....	.....	.....	.....	.....	.....
54..	Artificial flowers and jewelry	8,126	11,217	8,557	45,283	121,013	114,738
55..	Trunks and valises	5,270	6,126	5,099	10,370	12,207	15.096
56..	Bricks and lime	17,623	24,174	8,671	16,348	22,045	13,539
57..	Oil cake	.....	.....	.....	.....	.....	.....
58..	Articles not enumerated	1,108,984	1,137,828	1,408,278	3,869,071	3,793,341	2,877,659
59..	Total	$10,476,345	$12,858,758	$11,280,075	$15,196,451	$20,136,967	$18,862,931
60..	Gold and silver coin and bullion	62,620	2,700,412	956,874	2,046,679	18,069,580	37,437,837
61..	Aggregate	$10,538,965	$15,559,170	$12,236,949	$17,243,130	$38,206.547	$56,300.768

TABLE XXVII.—BANK STATISTICS OF

	Items.	Eastern States.			Middle States.			Southern States.	
		1858–'59.	1859–'60.	1860–'61.	1858–'59.	1859–'60.	1860–'61.	1858–'59.	1859–'60.
1....	Banks and branches	501	505	506	477	485	488	139	146
2....	Capital paid in	$119,590,423	$123,449,075	$123,706,708	$156,382,227	$159,091,051	$160,085,360	$48,578,132	$54,583,256
3....	Loans and discounts	179,992,400	190,186,990	194,866,619	284,716,143	289,636,640	304,227,203	77,039,922	82,231,588
4....	Stocks	1,206,564	1,657,908	1,489,941	29,924,425	31,227,492	33,521,858	8,625,484	9,625,777
5....	Real estate	3,640,675	3,844,810	3,623,549	10,675,795	11,481,225	11,685,602	6,639,639	10,313,308
6....	Other investments	1,044,319	1,075,879	1,141,438	1,309,619	1,319,363	3,829,149	4,102,185	3,067,297
7....	Due by other banks	16,333,357	14,310,756	14,015,271	23,137,793	20,061,485	22,625,292	10,122,640	7,461,775
8....	Notes of other banks	6,495,545	7,026,319	7,003,127	3,588,204	9,220,661	4,476,163	2,452,404	3,446 976
9....	Cash items	495,220	325,511	365,602	23,423,266	17,480,612	21,060,613	950,756	186,031
10....	Specie	13,774,125	10,098,162	10,037,304	43,971,104	33,229,061	37,749,614	10,679,614	10,130,319
11....	Circulation	39,564,689	44,510,618	44,991,285	49,482,057	53,146,871	52,873,851	37,400,883	35,863,618
12....	Deposits	41,877,420	41,319,550	40,822,523	150,620,922	145,829,987	156,899,656	18,119,776	18,250,347
13....	Due to other banks	9,370,024	8,987,151	9,666,483	42,286,596	35,213,553	36,386,050	6,641,306	4,030,096
14....	Other liabilities	2,819,422	1,541,091	2,811,728	3,731,452	4,391,664	11,072,379	3,833,720	3,436,648

* In this table the classification of the states is as follows, Texas, Arkansas, Iowa, California, and Oregon being omitted : Eastern states, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut ; middle states, New York, New Jersey, Pennsylvania, Delaware, Maryland ; southern states, Virginia, North Carolina. South Caro-

exported to Foreign Countries from June 30, 1846, to June 30, 1861.

	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1661.
1..	$113,602	$87,140	$69,905	$74,006	$91,963	$85,926	$94,850	$131,803	$94,495
2..	375,780	370,488	526,463	360,444	368,206	200,724	377,944	301,674	287,881
3..	10,230	12,257	2,771	1,476	1,932	2,304	2,444	2,593	2,157
4..	141,173	282,919	384,144	500,945	1,248,234	476,722	273,576	311,595	867,954
5..	329,381	809,965	1,448,280	1,329,151	1,216,635	1,267,691	760,889	930,644	850,546
6..	.....	.....	101,836	95,484	120,011	249,432	188,746	219,199	593,185
7..	17,582	131,048	189,830	154,630	108,008	115,893	75,699	85,292	39,138
8..	20,443	16,945	17,281	26,034	30,788	24,336	35,156	41,368	38,202
9..	64,677	53,503	45,069	45,086	48,732	59,582	78,226	53,573	39,480
10..	362,960	1,084,329	1,186,732	896,238	795,490	1,137,507	1,840,229	1,943,088	1,220,769
11..	.....	.....	82,945	161,232	92,499	60,958	50,793	55,783	81,788
12..	714,556	763,197	808,960	982,042	879,448	932,499	1,067,197	1,079,114	838,049
13..	184,497	244,638	290,525	370,259	476,394	777,921	655,600	816,973	472.080
14..	91,261	176,404	177,914	226,682	254,208	126,525	216,704	211,602	156,956
15..	48,229	53,311	64,886	31,249	45,222	55,280	58,870	71,832	61,469
16..	681,362	891,566	1,111,349	1,200,764	1,242,604	934,303	1,187,965	1,203,104	1,138,696
17..	1,671,500	1,551,471	1,500,113	1,829,207	1,458,553	2,410,224	3,402,491	3,383,428	2,760,531
18..	673,708	896,555	1,052,406	1,313,311	1,311,709	1,269,494	1,319,898	1,456,834	1,335,078
19..	103,216	194,076	315,267	367,182	286,163	212,840	820,435	240,572	255,274
20..	180,048	212,700	356,051	644,974	898,244	365,173	871,603	467,772	347,108
21..	119,729	159,026	156,879	311,496	190,699	162,650	212,710	129,717	144,046
22..	5,540	26,874	14,298	27,512	58,624	48,119	28,575	50,446	6,241
23..	181,998	308,127	288,437	286,960	397,813	205,931	257,662	246,154	311,321
24..	220,420	459,775	306,439	288,316	289,967	464,415	128,659	282,848	76,750
25..	2,097,234	3,472,467	3,158,596	3,585,712	4,197,687	4,059,528	5,117,346	5,174,040	5,536,576
26..	108,205	92,108	690,766	534,846	607,054	1,985,223	1,048,246	1,664,122	2,375,029
27..	327,073	454,789	788,114	1,066,294	886,909	681,278	796,008	1,115,455	1,149,438
28..	1,086,167	1,147,786	2,618,655	1,966,845	1,785,685	2,069,194	2,320,890	3,356,449	2,215,032
29..	6,026,485	4,130,149	2,907,276	4,616,264	3,715,339	1,782,025	1,518,236	1,785,595	1,377,627
30..	22,504	49,315	.....	.....	.....	.....	.....	.....	......
31..	733,648	423,085	336,250	384,200	614,153	1,800,285	4,477,096	5,792,752	4,864,379
32..	2,924	24,456	2,506	802	1,066	1,326	1,349	1,243	80
33..	13,860	55,261	34,002	25,233	33,687	87,766	17,529	26,571	39,490
34..	239,733	234,388	233,801	278,832	333,442	210,695	470,613	525,175	462,554
35..	53,685	34,525	32,119	66,696	34,256	36,783	47,261	65,086	40,524
36..	31,395	37,684	32,049	32,653	39,799	46,349	46,007	23,345	32,792
37..	6,612	9,501	10,856	8,385	7,824	49,153	44,638	61,377	62,360
38..	1,673	3,204	4,916	2,778	783	8,791	12,094	15,979	8,910
39..	6,183	11,658	8,441	5,989	6,846	6,339	4,837	4,862	1,271
40..	.....	.....	1,409,107	1,093,538	643,512	313,379	198,827	240,841	193,691
41..	6,448	17,018	36,045	5,765	2,119	13,099	41,465	19,011	7,507
42..	9,652	6,597	14,829	29,088	21,524	7,220	3,213	9,948	7,940
43..	32,250	33,012	36,405	67,517	52,747	106,498	68,868	157,124	106,562
44..	52,397	126,128	106,857	133,517	127,748	97,775	155,101	129,653	150,974
45..	142,604	187,335	207,218	202,502	277,647	209,774	319,080	278,268	250,365
46..	122,212	192,339	185,637	203,013	224,767	229,991	299,857	285,708	347,915
47..	83,020	121,823	163,096	217,179	223,320	131,217	185,068	223,809	240,923
48..	170,561	229,476	204,679	216,439	179,900	214,608	252,816	277,948	394,731
49..	22,988	30,750	14,279	13,610	5,622	24,186	39,289	39,064	30,229
50..	14,064	16,478	5,233	5,628	4,818	27,327	28,782	46,081	30,584
51..	47,628	88,327	168,546	162,376	111,403	138,590	112,214	176,239	185,267
52..	11,873	1,311,513	9,051	6,116	15,477	26,386	35,947	140,187	53,872
53..	.....	442,383	806,119	831,724	665,480	129,184	.....	258,682	631,450
54..	66,397	50,471	22,043	26,386	28,070	28,901	58,570	24,866	50,199
55..	27,148	23,673	35,203	32,457	37,748	59,441	42,153	50,184	40,622
56..	32,025	33,314	57,393	64,297	68,002	103,821	160,611	154,045	93,292
57..	.....	.....	.....	.....	.....	1,435,861	1,198,581	1,609,328	1,386,691
58..	3,788,700	4,972,084	4,014,432	3,559,613	3,292,722	2,601,788	2,274,652	2,397,445	2,580,689
59..	$22,599,930	$26,849,411	$28,833,299	$30,970,992	$29,653,267	$30,372,180	$33,853,660	$39,803,080	$36.418,254
60..	23,548,535	38,234,566	53,957,418	44,148,279	60,078,352	42,407,246	57,502,305	56,946,851	23,799,870
61..	$46.148.465	$65,083,977	$82,790.717	$75,119,271	$89,731.619	$72,779,426	$91,355,965	$96,749,931	$60,218,124

the United States, 1858–'61.*

	Southern States.	South-western States.			Western States.			Totals of Banks of United States.		
	1860–'61.	1858–'59.	1859–'60.	1860–'61.	1858–'59.	1859–'60.	1860–'61.	1858–'59.	1859–'60.	1860–'61.
1....	147	116	138	141	243	288	219	1,476	1,562	1,601
2....	$56,282,622	$54,254,042	$59,383,524	$62,941,011	$23,171,418	$25,373,189	$26,577,012	$401,976,242	$421,880,095	$429,592,713
3....	79,282,290	85,980,791	101,468,716	89,069,505	29,454,543	28,421,346	29,332,804	657,183,799	691,945,580	696,778,421
4....	9,947,427	8,513,363	9,177,273	8,251,792	15,232,613	18,655,893	20,793,853	63,502,449	70,344,343	74,004,879
5....	10,559,530	3,720,584	3,613,520	3,722,463	1,299,804	1,529,268	1,157,783	25,976,497	30,782,131	30,748,927
6....	3,460,720	1,025,804	1,383,083	3,323,320	841,114	4,277,549	4,902,884	8,323,041	11,123,171	16,657,511
7....	5,138,659	21,168,632	17,317,715	7,628,183	7,482,565	8,083,726	9,391,585	78,244,987	67,235,457	58,793,990
8....	3,782,997	3,479,624	2,964,599	3,403,069	2,842,512	2,844,012	3,238,546	18,858,289	25,502,567	21,903,902
9....	179,980	1,635,943	973,792	7,420,351	303,646	365,575	271,332	26,808,822	19,331,521	29,297,878
10....	8,119,036	31,359,021	25,793,477	25,999,992	4,753,954	4,343,527	5,768,161	104,537,818	83,594,537	87,674,507
11....	39,552,760	42,632,764	46,000,759	34,600,785	24,226,425	27,580,611	29,987,086	193,306,818	207,102,477	202,005,767
12....	16,480,480	38,581,455	37,973,832	30,576,820	10,368,705	10,428,413	12,450,083	259,568,278	253,802,129	257,229,562
13....	4,117,369	9,197,277	6,764,829	7,661,391	720,448	937,289	3,443,963	68,215,651	55,932,918	63,275,256
14....	4,135,271	2,224,354	2,859,607	2,674,929	2,499,499	2,432,805	2,563,697	15,048,427	14,661,815	23,258,004

lina, Georgia, Florida; south-western states, Alabama, Mississippi, Louisiana, Tennessee, Kentucky, Missouri ; western states, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Kansas, Nebraska territory.

TABLE XIX.—EXPORTS AND IMPORTS OF EACH STATE IN 1850 AND 1860.

States.	Value of exports.						Value of imports.	
	Domestic products.		Foreign products.		Total.			
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Maine	$1,536,818	$3,824,426	$20,094	$845,129	$1,556,912	$3,669,555	$856,411	$1,716,075
New Hampshire	8,722	2,722	205	608	8,927	3,325	49,079	18,605
Vermont	404,749	257,083	26,157	526,619	430,906	783,702	463,092	2,731,857
Massachusetts	8,253,478	15,246,419	2,428,290	1,756,858	10,681,768	17,003,277	30,374,684	41,187,539
Rhode Island	206,299	211,947	9,966	8,949	216,265	220,896	258,808	495,982
Connecticut	241,262	731,776	668	11,405	241,930	743,181	372,890	1,419,726
New York	41,502,800	126,060,967	11,209,989	19,494,482	52,712,789	145,555,449	111,123,524	248,489,877
New Jersey	1,655	89,845	....	....	1,655	89,343	1,494	5,428
Pennsylvania	4,049,464	5,542,815	452,142	85,512	4,501,606	5,628,327	12,066,154	14,634,279
Delaware	....	87,426	....	....	....	87,426	....	2,061
Maryland	6,589,481	8,804,606	377,872	196,994	6,967,353	9,001,600	6,124,201	9,784,773
Dist. of Columbia	80,388	4,418	200	....	80,588	4,418	59,819	8,275
Virginia	3,413,158	5,833,371	2,488	24,653	3,415,646	5,858,024	426,599	1,326,249
North Carolina	416,501	760,094	....	....	416,501	760,094	323,692	365,981
South Carolina	11,446,892	21,193,723	908	11,614	11,447,800	21,205,337	1,933,785	1,569,570
Georgia	7,551,943	18,483,088	....	....	7,551,943	18,483,088	636,964	782,061
Florida	2,607,968	1,299,852	15,656	30,878	2,623,624	1,330,230	95,709	336,981
Alabama	10,544,858	38,670,183	....	....	10,544,858	38,670,183	865,362	1,050,310
Louisiana	37,698,277	107,812,580	407,073	605,218	38,105,350	108,417,798	10,760,499	22,922,773
Texas	24,958	5,856,934	....	927,000	24,958	6,783,934	25,650	2,496,466
Tennessee	....	....	....	....	....	....	27,966	....
Kentucky	....	....	....	....	....	....	190,987	....
Ohio	217,582	284,810	100	....	217,682	284,810	582,504	259,564
Michigan	182,045	8,826,932	....	....	182,045	8,826,932	144,102	976,179
Illinois	17,669	1,165,183	....	....	17,669	1,165,183	15,705	60,214
Wisconsin	....	187,111	....	....	....	187,111	....	3,455
California	....	7,388,394	....	2,907,608	....	10,296,002	....	9,530,656
Oregon	....	118,126	....	....	....	118,126	....	1,966
Total	$136,946,912	$373,189,274	$14,951,808	$26,933,022	$151,898,720	$400,122,296	*$178,138,318	$362,166,254

TABLE XX.—EXPORTS AND IMPORTS OF EACH STATE DURING THE YEAR ENDING JUNE 30, 1861.

States.	Value of exports.							Value of imports.		
	Domestic products.			Foreign products.			Total domestic and foreign.	In American vessels.	In foreign vessels.	Total.
	In American vessels.	In foreign vessels.	Total.	In American vessels.	In foreign vessels.	Total.				
Maine	$2,581,816	$1,738,309	$4,320,125	$123,268	$84,066	$207,334	$4,527,459	$1,312,060	$619,945	$1,932,005
New Hampshire	3,513	2,649	6,162	....	....	....	6,162	10,493	10,394	20,887
Vermont	244,657	....	244,657	564,416	....	564,416	809,073	3,459,811	....	3,459,811
Massachusetts	10,901,739	3,090,703	13,992,442	1,525,177	1,055,117	2,580,294	16,572,736	26,209,173	19,190,671	45,399,844
Rhode Island	246,624	2,953	249,577	5,561	159	5,720	255,297	350,016	192,636	542,652
Connecticut	408,063	5,573	413,636	7,434	250	7,684	421,320	733,643	19,666	753,309
New York	100,778,436	42,785,397	143,563,833	9,404,889	5,637,796	15,042,685	158,606,518	130,412,719	106,990,007	237,402,726
New Jersey	39,835	6,232	46,067	....	....	....	46,067	328	5,182	5,510
Pennsylvania	8,247,530	1,655,540	9,903,070	88,378	21,649	110,027	10,013,097	11,170,665	1,457,683	12,628,348
Delaware	85,370	15,183	100,553	....	....	....	100,553	1,004	....	1,004
Maryland	8,556,879	4,392,746	12,949,625	188,605	102,113	290,718	13,240,343	8,150,702	1,298,403	9,449,105
Dist. Columbia	....	....	....	....	....	....	....	348	937	1,285
Virginia	2,969,271	791,353	3,760,624	....	....	....	3,760,624	699,999	91,908	791,907
North Carolina	301,114	99,555	400,669	....	....	....	400,669	82,699	87,724	170,423
South Carolina	3,888,403	1,567,178	5,455,581	....	....	....	5,455,581	730,416	76,064	806,480
Georgia	243,140	68,400	311,540	....	....	....	311,540	159,351	15,977	175,328
Florida	608,164	20,644	628,808	8,970	....	8,970	637,778	153,041	2,010	368,857
Alabama	6,917,346	1,554,655	8,472,001	....	....	....	8,472,001	356,986	11,871	155,051
Louisiana	5,932,415	890,942	6,823,357	65,847	22,717	88,564	6,911,921	10,997,779	963,090	11,960,869
Texas	805,734	389,618	1,195,352	....	....	....	1,195,352	106,984	118,730	225,714
Ohio	428,566	254,629	683,195	....	....	....	683,195	141,139	104,467	245,606
Michigan	171,770	158,982	330,752	....	....	....	330,752	556,718	....	556,718
Illinois	2,825,379	696,964	3,522,343	....	....	....	3,522,343	38,550	38,798	77,348
Wisconsin	545,968	239,864	785,832	....	....	....	785,832	5,456	2,774	8,230
California	8,693,334	1,725,078	10,418,412	1,443,849	295,166	1,739,015	12,157,427	5,698,845	2,807,661	8,506,506
Oregon	121,273	....	121,273	....	....	....	121,273	5,130	....	5,130
Total	166,546,339	62,153,147	228,699,486	13,426,394	7,219,033	20,645,427	249,344,913	201,544,055	134,106,098	335,650,153

TABLE XXI.—EXPORTS TO AND IMPORTS FROM CANADA AND OTHER BRITISH POSSESSIONS IN NORTH AMERICA FROM JULY 1, 1851, TO JUNE 3, 1861, SHOWING THE OPERATION OF THE RECIPROCITY TREATY.

Year ending	Exports.			Imports.	Increase each successive year over 1852.	
	Foreign.	Domestic.	Total.		Exports.	Imports.
June 30, 1852	$3,853,919	$6,655,097	$10,509,016	$6,110,299	......	......
" 1853	5,736,555	7,404,087	13,140,642	7,550,778	$2,631,626	$1,440,479
" 1854	9,362,716	15,204,144	24,566,860	8,927,560	14,057,844	2,817,261
" †1855	11,999,378	15,806,642	27,806,020	15,136,734	17,297,004	9,026,435
" 1856	6,314,652	22,714,697	29,029,349	21,310,421	18,520,333	15,200,122
" 1857	4,326,369	19,936,113	24,262,482	22,124,296	13,753,466	16,013,997
" 1858	4,012,768	19,638,959	23,651,727	15,806,519	13,142,711	9,696,220
" 1859	6,384,547	21,769,627	28,154,174	19,727,551	17,645,158	13,617,252
" 1860	2,918,524	11,264,590	14,183,114	18,861,678	3,674,098	12,751,379
" 1861	2,505,735	11,016,664	13,522,399	14,791,684	3,013,383	8,681,385
Total	$57,415,168	$151,410,620	$208,825,788	$150,347,355	$103,735,623	$80,194,465

* Including imports into Missouri to the amount of $359,643. † First year under the reciprocity treaty.

Table XXII.—Quantity and Value of Agricultural Staples exported in each year from 1847 to 1861.

Years.	Breadstuffs and provisions.	Cotton.					Tobacco.		Rice.		
	Value.	Sea Island.	Other.	Total.	Value.	Price per lb.	Hhds.	Value.	Barrels.	Tierces.	Value.
	Dollars.	Lbs.	Lbs.	Lbs.	Dollars.	Cents.		Dollars.			Dollars.
1847..	68,701,121	6,293,973	520,925,985	527,219,958	53,415,848	10.34	135,762	7,242,086	....	144,427	3,605,896
1848..	37,472,751	7,724,148	806,550,283	814,274,431	61,998,294	7.61	130,665	7,551,122	....	100,403	2,331,824
1849..	38,155,507	11,969,259	1,014,633,010	1,026,602,269	66,396,967	6.40	101,521	5,804,207	....	128,861	2,569,362
1850..	26,051,373	8,236,463	627,145,141	635,381,604	71,984,616	11.30	145,729	9,951,023	....	127,069	2,631,557
1851..	21,948,651	8,299,656	918,937,433	927,237,089	112,315,317	12.11	95,945	9,219,251	....	105,590	2,170,927
1852..	25,857,027	11,738,075	1,081,492,564	1,093,230,639	87,965,732	8.05	137,097	10,031,283	....	119,733	2,470,029
1853..	32,985,322	11,165,165	1,100,405,205	1,111,570,370	109,456,404	9.85	159,853	11,319,319	....	67,707	1,657,658
1854..	65,941,323	10,486,423	977,346,683	987,833,106	93,596,220	9.47	126,107	10,016,046	....	105,121	2,634,127
1855..	38,895,348	13,058,590	995,366,011	1,008,424,601	88,143,844	8.74	150,213	14,712,468	19,774	52,520	1,717,953
1856..	77,187,301	12,797,225	1,338,634,476	1,351,431,701	128,382,351	9.49	116,962	12,221,843	81,038	58,668	2,390,233
1857..	74,667,852	12,940,725	1,035,341,750	1,048,282,475	131,575,859	12.55	156,848	20,662,772	74,309	64,332	2,290,400
1858..	50,683,285	12,101,058	1,106,522,954	1,118,624,012	131,386,661	11.72	127,670	17,009,767	49,283	64,015	1,870,578
1859..	38,305,991	13,713,556	1,372,755,000	1,386,468,556	161,434,923	12.72	198,846	21,074,038	69,946	81,820	2,207,148
1860..	45,271,850	15,598,698	1,752,087,640	1,767,686,338	191,806,555	10.85	167,274	15,906,547	77,837	84,163	2,567,399
1861..	94,866,735	6,170,321	301,345,778	307,516,099	34,051,483	11.07	160,816	13,784,710	50,038	89,162	1,382,178

Table XXIII.—Value of Foreign Merchandise, Domestic Merchandise, and Specie exported in each year from June 30, 1846, to June 30, 1861.

Years.	Value of exports, exclusive of specie.					Specie and bullion.
	Foreign merchandise.			Domestic produce.	Aggregate value of exports.	
	Free of duty.	Paying duty.	Total.			
1847..............	$1,812,847	$4,353,907	$6,166,754	$150,574,844	$156,741,598	$1,907,024
1848..............	1,410,307	6,576,499	7,986,806	130,203,709	138,190,515	15,841,616
1849..............	2,015,815	6,625,276	8,641,091	131,510,081	140,351,172	5,404,648
1850..............	2,099,132	7,376,361	9,475,493	134,900,233	144,375,726	7,522,994
1851..............	1,742,154	8,552,967	10,295,121	178,620,138	188,915,259	29,472,252
1852..............	2,538,159	9,514,925	12,053,084	154,931,147	166,984,231	42,674,135
1853..............	2,449,539	11,170,581	13,620,120	189,869,162	203,489,282	27,486,875
1854..............	3,210,907	18,437,397	21,648,304	215,156,304	236,804,608	41,436,456
1855..............	6,516,550	19,641,818	26,158,368	192,751,135	218,909,503	56,247,343
1856..............	3,144,604	11,636,768	14,781,372	266,438,051	281,219,423	45,745,485
1857..............	4,325,400	10,591,647	14,917,047	278,906,713	293,823,760	69,136,922
1858..............	5,751,850	14,908,391	20,660,241	251,351,033	272,011,274	52,633,147
1859..............	5,429,921	9,080,050	14,509,971	278,392,080	292,902,051	63,887,411
1860..............	5,350,441	11,983,193	17,333,634	316,242,423	333,576,057	66,546,239
1861..............	3,582,297	10,965,778	14,548,075	204,166,299	218,714,374	29,791,080

Table XXIV.—Value of the Imports of Merchandise and Specie for each year from June 30, 1846, to June 30, 1861.

Years.	Specie and bullion.	Free of duty.	Paying duty.	Total.
1847....	24,121,289	17,651,347	104,773,002	146,545,638
1848....	6,360,224	16,356,379	132,282,325	154,998,928
1849....	6,651,240	15,726,425	125,479,774	147,857,439
1850....	4,628,792	18,081,590	155,427,936	178,138,318
1851....	5,453,592	19,652,995	191,118,345	216,224,932
1852....	5,505,044	24,187,890	183,252,508	212,945,442
1853....	4,201,382	27,182,152	236,595,113	267,978,647
1854....	6,958,184	26,327,637	371,276,560	304,562,381
1855....	3,659,812	36,430,524	221,378,184	261,468,520
1856....	4,207,632	52,748,074	257,684,236	314,639,942
1857....	12,461,799	54,267,507	294,160,835	360,890,141
1858....	19,274,496	61,044,779	202,293,875	282,613,150
1859....	7,434,789	72,286,327	259,047,014	338,768,130
1860....	8,550,135	82,291,614	279,872,327	362,163,941
1861....	46,339,611	116,170,887	218,179,566	334,350,458

Table XXV.—Tonnage of the United States for each year from June 30, 1846, to June 30, 1861.

Years.	Registered sail tonnage.	Registered steam tonnage.	Enrolled and licensed sail tonnage.	Enrolled and licensed steam tonnage.	Total tonnage.
1847.....	1,235,682	5,631	1,198,523	399,210	2,839,046
1848.....	1,344,819	16,068	1,381,332	411,823	3,154,042
1849.....	1,418,072	20,870	1,453,459	441,525	3,334,016
1850.....	1,540,769	44,429	1,468,738	481,005	3,535,454
1851.....	1,663,917	62,390	1,524,915	521,217	3,772,439
1852.....	1,819,744	79,704	1,675,456	563,536	4,138,440
1853.....	2,013,154	90,520	1,789,238	514,098	4,407,010
1854.....	2,238,783	95,036	1,887,512	581,571	4,802,902
1855.....	2,440,091	115,045	2,021,625	655,240	5,212,001
1856.....	2,401,687	89,715	1,796,888	583,362	4,871,652
1857.....	2,377,094	86,873	1,857,964	618,911	4,940,842
1858.....	2,499,742	78,027	2,550,067	651,363	5,049,808
1859.....	2,414,654	92,748	1,961,631	676,005	5,145,038
1860.....	2,448,941	97,296	2,036,990	770,641	5,353,868
1861.....	2,540,020	102,608	2,122,589	774,596	5,539,813

Table XXVI.—Nationalities of Foreign Vessels entering and departing from the Ports of the United States, 1860–'61.

National character of vessels.	Entered.		Cleared.		National character of vessels.	Entered.		Cleared.	
	Number.	Tons.	Number.	Tons.		Number.	Tons.	Number.	Tons.
Austrian	46	17,986	30	12,168	Oldenburg...........	16	6,365	16	6,296
Bremen	165	112,966	178	125,866	Prussian	60	27,862	60	28,727
Belgian	2	995	8	1,828	Portuguese.........	23	5,620	20	4,969
British	9,895	1,882,971	9,818	1,882,747	Peruvian	8	829	1	460
Brazilian	2	946	8	1,809	Russian.............	22	12,752	17	10,378
Chilian..............	9	3,633	5	1,899	Swedish.............	79	29,491	83	34,788
Danish	85	9,806	84	9,457	Sardinian...........	44	14,540	84	11,627
Dutch...............	48	10,528	51	12,836	Sicilian.............	8	2,345	19	6,028
French..............	55	15,291	56	14,056	Spanish	74	24,877	51	15,691
Hamburg...........	78	73,765	64	68,908	Sandwich Islands....	8	1,026	6	687
Hanoverian	10	3,824	12	4,947	Venezuelan.........	2	348	..	....
Mecklenburg	9	3,558	7	2,960					
Mexican.............	15	2,234	11	1,888	Total............	10,709	2,217,554	10,586	2,262,042
New Granadian.....	11	3,001	12	3,197					

TABLE XXVIII.—CONDITION OF BANKS IN THE UNITED STATES, 1858-'61.*

	1858.	1859.	1860.	1861.
Number of banks and branches	1,422	1,476	1,562	1,601
Capital paid in	$394,622,799	$401,976,242	$421,880,095	$429,592,713
Resources :—Loans and discounts	583,165,242	657,183,799	691,945,580	696,778,421
Stocks	60,305,260	63,502,449	70,344,343	74,004,879
Real estate	28,755,834	25,976,497	30,782,131	30,748,927
Other investments	6,075,906	8,328,041	11,123,171	16,657,511
Due by other banks	58,052,802	78,244,987	67,235,457	58,793,990
Notes of other banks	22,447,436	18,858,289	25,502,567	21,903,902
Cash items	15,380,441	26,808,822	19,331,521	29,297,578
Specie	74,412,832	104,537,818	83,594,537	87,674,507
Liabilities :—Circulation	155,208,344	193,306,818	207,102,477	202,005,767
Deposits	185,932,049	259,568,278	253,802,129	257,229,562
Due to other banks	51,169,875	68,215,651	55,932,918	61,275,256
Other liabilities	14,166,713	15,048,427	14,661,815	23,258,004
Aggregate of immediate liabilities, *i. e.*, of circulation, deposits, and dues to other banks	392,310,268	521,090,747	516,837,524	520,510,585
Aggregate of immediate means, *i. e.*, of specie, cash items, notes of other banks, dues from other banks	170,293,511	228,449,916	195,664,082	197,670,277
Gold and silver in United States treasury depositories	10,229,229	3,083,600	6,695,225	3,600,000
Total of specie in banks and treasury depositories	84,642,061	107,571,418	90,289,762	91,274,507

TABLE XXIX.—COINAGE OF THE MINT AND ITS BRANCHES FROM THEIR ESTABLISHMENT TO 1861.

Mints.	Commencement of the coinage.	Gold coinage.	Silver coinage.	Copper coinage.	Entire coinage.	
		Value.	Value.	Value.	Pieces.	Value.
Philadelphia (to June 30, 1861)	1793	$374,892,070 25	$95,558,090 57	$2,647,478 55	698,219,648	$478,092,684 37
San Francisco (to June 30, 1861)	1854	128,987,156 81	1,782,554 06	....	9,919,789	130,719,710 87
New Orleans (to Jan. 31, 1861)	1838	40,381,615 00	29,890,087 18	....	94,900,695	70,271,652 18
Charlotte (to March 31, 1861)	1838	5,048,641 50	....	....	1,206,954	5,048,641 50
Dahlonega (to Feb. 28, 1861)	1838	6,121,919 00	....	....	1,881,750	6,121,919 00
Assay Office, New York (to June 30, 1861)	1854	113,685,004 06	983,800 21	....	88,694	114,668,804 27
Total	....	$669,116,406 62	$128,159,481 97	$2,647,478 55	800,662,475	$799,923,862 14

TABLE XXX.—STATISTICS OF COMMON SCHOOL EDUCATION IN 1860, DERIVED CHIEFLY FROM STATE RETURNS.†

States.	Population.	Whole number of children between 5 and 20 years of age.	Whole number attending public schools.	Amount of annual current expenses for public schools.	Average monthly wages of teachers, inclusive of board.		Amount of school fund.	Average number of months' school per annum.	Average cost of tuition to each pupil.	Amount raised by tax.
					Males.	Females.				
Maine	628,279	229,321	153,063	$617,889 48	$29 15	$16 16	....	5.00	$1 97	$405,063 54
New Hampshire	326,073	106,951	86,708	282,842 00	25 30	14 15	....	5.20	3 26	215,465 00
Vermont	315,098	96,568	90,110	265,623 00	26 92	15 64	None.	5.50	2 95	....
Massachusetts	1,231,066	283,000	211,388	1,519,171 00	48 90	19 02	$1,523,319 33	7.60	6 56	1,390,382 00
Rhode Island	174,620	35,902	26,876	162,687 18	34 50	20 34	245,100 12	8.50	5 60	91,284 40
Connecticut	460,147	125,000	91,315	364,500 00	30 00	16 00	2,046,397 32	7.50	3 99	84,419 00
New York	3,880,735	1,158,224	851,533	3,664,617 57	..	..	5,752,917 83	7.60	4 32	1,921,464 65
New Jersey	672,035	196,944	131,748	539,532 45	33 17	19 50	460,804 80	9.25	5 04	358,275 12
Pennsylvania	2,906,115	960,731	647,114	2,619,377 28	24 36	17 79	....	5.30	6 36	1,667,520 62
Delaware	112,216	31,544	11,468	78,253 14	..	..	440,505 83	7.60	4 17	58,057 02
Maryland	687,049	250,771	33,111	218,836 00	..	..	327,263 00	..	6 63	....
Dist. Columbia	75,080	27,404	5,618	‡17,182 00	..	..	....	..	..	....
Virginia	1,596,318	582,656	54,232	160,530 42	..	..	1,833,420 17	8.00	2 96	....
North Carolina	992,622	352,307	116,638	235,410 57	28 00	20 00	2,181,850 00	4.00	2 11	60,000 00
South Carolina	703,708	256,853	16,841	74,400 00	..	..	....	..	4 40	....
Georgia	1,057,286	117,670	79,922	179,090 00	..	..	582,500 00	..	15 50	150,000 00
Florida	140,425	22,512	‡5,218	24,798 00	..	..	460,000 00	..	..	....
Alabama	964,201	‡178,095	§69,127	271,580 72	..	..	1,425,000 00	6.00	1 30	....
Mississippi	791,305	316,522	18,746	85,525 00	..	..	600,000 00	..	..	....
Louisiana	708,002	283,200	86,000	650,000 00	..	..	969,113 00	..	18 05	....
Texas	604,215	104,447	§39,316	111,184 00	..	..	2,531,520 64	..	1 06	....
Arkansas	435,450	174,180	10,369	54,425 13	..	..	....	..	..	....
Tennessee	1,109,801	294,497	126,317	230,430 27	..	..	1,500,000 00	..	1 83	....
Kentucky	1,155,684	462,273	97,001	304,933 20	..	..	2,067,332 00	..	..	....
Ohio	2,339,502	865,914	600,034	2,760,828 67	27 82	16 29	3,000,000 00	6.20	4 30	2,461,325 93
Michigan	749,113	299,645	206,014	467,286 00	..	..	1,183,589 98	5.60	2 27	....
Indiana	1,350,428	495,019	§383,619	821,713 80	28 25	18 06	4,929,866 24	4.00	..	....
Illinois	1,711,951	470,540	457,113	2,705,052 00	29 66	19 48	1,952,090 00	6.83	5 91	1,306,469 00
Wisconsin	775,881	299,133	198,443	854,766 00	23 00	14 62	1,316,360 00	..	4 30	723,130 00
Minnesota	173,855	42,258	20,808	88,911 23	..	..	500,000 00	..	4 23	82,511 97
Iowa	674,948	233,927	81,672	198,103 00	..	..	2,303,676 00	..	..	85,000 00
Missouri	1,182,012	341,121	157,526	608,908 00	..	..	678,967 96	..	3 89	....
California	379,994	76,976	39,736	427,004 00	..	..	803,320 00	7.00	10 90	205,212 00
Total	31,065,414	9,722,105	5,154,895	$21,185,627 04	..	..	$41,607,212 22	..	..	....

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* See table XXVII. on pp. 806-'7.

† Kansas, Oregon, and the territories are omitted, no school statistics being obtainable from them.

‡ Whites only.

§ Estimated.

TABLE XXXI.—EDUCATIONAL STATISTICS OF THE UNITED STATES ACCORDING TO THE CENSUS OF 1850.

States and Territories.	Colleges.					Academies and private schools.				
	Number.	Teachers.	Pupils.	Annual income. Returned.	Annual income. Estimated.	Number.	Teacher	Pupils.	Annual income. Returned.	Annual income. Estimated.
Maine	3	21	282	$14,000	$17,784	131	282	6,648	$51,187	$64,966
New Hampshire	1	18	278	11,000	11,000	107	188	5,321	48,202	52,591
Vermont	5	30	464	21,558	21,558	118	257	6,864	48,935	56,159
Massachusetts	6	85	1,043	107,901	121,929	403	521	13,436	310,177	354,521
Rhode Island	1	12	288	28,000	28,000	46	75	1,601	82,748	87,428
Connecticut	4	56	788	53,639	53,639	202	329	6,996	145,967	152,120
New York	18	174	2,678	148,258	217,267	887	3,136	49,328	810,332	1,015,249
New Jersey	4	49	470	79,700	79,700	225	458	9,844	227,588	300,242
Pennsylvania	22	184	3,520	286,805	318,070	524	914	23,751	467,848	570,501
Delaware	2	16	144	17,200	17,200	65	94	2,011	47,832	58,498
Maryland	13	98	1,127	118,714	122,408	223	508	10,787	232,841	239,088
Dist. of Columbia	2	36	218	24,000	24,000	47	126	2,333	84,040	84,040
Virginia	12	78	1,343	159,790	162,574	317	547	9,068	234,372	351,007
North Carolina	5	29	518	40,700	40,700	272	403	7,822	187,648	222,695
South Carolina	8	48	720	104,790	104,790	202	333	7,467	205,489	205,489
Georgia	13	84	1,585	105,430	105,430	219	318	9,059	108,983	184,849
Florida	...	....	....	....	....	34	49	1,251	13,089	22,742
Alabama	5	55	567	41,255	48,580	166	380	8,290	164,165	224,279
Mississippi	11	45	862	42,400	47,652	171	297	6,628	73,717	144,782
Louisiana	6	41	629	85,750	85,750	143	354	5,328	193,077	283,003
Texas	2	7	165	1,000	4,125	97	187	3,389	89,884	79,732
Arkansas	3	14	150	3,100	3,100	90	126	2,407	27,937	34,308
Tennessee	18	88	1,705	65,807	67,689	264	404	9,928	155,902	175,926
Kentucky	15	100	1,778	181,461	181,461	330	600	12,712	252,617	306,507
Ohio	26	180	3,621	125,792	145,292	206	474	15,052	149,892	201,077
Michigan	3	22	308	14,000	14,000	37	71	1,619	24,947	31,958
Indiana	11	61	1,069	43,350	43,350	131	288	6,185	63,520	78,219
Illinois	6	35	442	13,800	15,869	83	160	4,244	40,488	47,678
Wisconsin	2	8	75	4,700	4,700	58	86	2,723	18,796	19,899
Minnesota	...	....	....	....	....	1	1	12	140	....
Iowa	2	4	100	2,000	2,000	33	46	1,111	7,980	11,180
Missouri	9	65	1,009	79,528	88,277	204	368	8,829	148,171	183,408
California	...	....	....	....	....	6	5	170	14,270	20,892
Oregon	...	....	....	....	....	29	44	842	20,888	24,495
Utah	1	....	....	....	....	18	....	....	2,050	2,221
New Mexico	...	....	....	....	....	1	1	40	....	....
Total	239	1,678	27,821	$1,964,428	$2,142,859	6,085	12,260	263,096	$4,644,214	$5,881,179

States and Territories.	Public schools.					Ages and attendance.				
	Number.	Teachers.	Pupils.	Annual income. Returned.	Annual income. Estimated.	White persons between 5 and 20 years of age.	White persons over 20 years of age.	Returned as in colleges, academies, or public schools.	Whites and free colored attending school as returned by families.	Whites over 20 y'rs of age unable to read or write.
Maine	4,042	5,540	192,815	$315,436	$318,597	212,782	298,417	199,745	186,222	6,147
New Hampshire	2,381	3,018	75,643	166,944	167,988	104,220	160,282	81,237	83,221	2,957
Vermont	2,731	4,173	93,457	176,111	179,181	108,429	167,418	106,785	92,242	6,189
Massachusetts	3,679	4,443	176,475	1,006,795	1,010,346	303,920	568,583	190,924	222,220	27,539
Rhode Island	416	518	23,130	100,481	100,481	44,943	81,605	25,014	28,910	3,340
Connecticut	1,656	1,787	71,269	231,220	231,220	114,264	209,287	79,003	83,697	4,739
New York	11,580	13,965	675,221	1,472,657	1,486,428	1,088,407	1,612,212	727,222	693,321	91,293
New Jersey	1,478	1,574	77,930	216,672	220,840	165,881	284,660	88,244	91,601	14,248
Pennsylvania	9,061	10,024	413,706	1,348,249	1,362,949	824,670	1,095,286	440,977	504,610	66,928
Delaware	194	214	8,970	43,861	43,861	26,609	84,296	11,125	14,403	4,536
Maryland	898	986	33,111	218,836	221,817	147,717	209,859	45,025	62,063	20,815
Dist. of Columbia	22	84	2,169	14,232	14,232	18,857	19,541	4,720	6,570	1,457
Virginia	2,930	2,997	67,353	314,625	341,279	345,265	418,428	77,764	109,775	77,005
North Carolina	2,657	2,730	104,095	158,564	158,564	215,454	251,922	112,430	100,808	73,566
South Carolina	724	739	17,838	200,600	200,600	107,813	125,241	26,025	40,373	15,684
Georgia	1,251	1,265	32,705	182,231	190,285	215,091	217,774	43,299	77,016	41,200
Florida	69	73	1,878	22,386	31,777	18,097	21,305	3,129	4,812	3,859
Alabama	1,152	1,195	28,380	315,602	390,989	176,657	178,417	37,237	62,846	33,757
Mississippi	782	826	18,746	254,159	267,821	121,089	128,222	26,236	48,808	18,405
Louisiana	664	822	25,046	349,679	362,412	84,283	134,033	31,003	84,057	21,221
Texas	349	360	7,946	44,088	94,554	59,885	68,165	11,500	19,869	10,525
Arkansas	353	355	8,493	43,763	63,411	67,545	64,787	11,050	23,361	16,819
Tennessee	2,680	2,819	104,117	198,518	260,258	214,120	316,209	115,750	146,200	77,522
Kentucky	2,234	2,306	71,429	211,852	215,068	302,899	382,870	85,914	181,205	66,687
Ohio	11,661	12,886	484,153	743,074	751,576	757,633	890,888	502,826	514,809	61,030
Michigan	2,714	3,231	110,455	167,806	168,764	151,216	184,240	112,382	105,961	7,912
Indiana	4,822	4,860	161,500	316,955	329,095	399,292	411,975	168,754	220,961	70,540
Illinois	4,052	4,248	125,725	349,712	356,416	385,463	369,218	130,411	182,292	40,054
Wisconsin	1,423	1,529	58,817	118,133	118,874	104,882	148,581	61,615	56,421	6,361
Minnesota	....	....	....	....	....	1,787	3,382	12	209	649
Iowa	740	828	29,556	51,492	52,620	76,863	81,278	30,767	35,473	8,120
Missouri	1,570	1,620	51,754	160,770	168,961	234,773	257,068	61,592	95,285	36,281
California	2	2	49	3,600	14,700	9,484	80,257	219	998	5,118
Oregon	3	4	80	3,927	3,927	4,452	6,588	922	1,877	157
Utah	13	....	....	11,512	11,512	4,057	5,107	....	2,035	153
New Mexico	....	....	....	....	....	22,774	29,958	40	466	25,085
Total	80,978	91,966	3,354,011	$9,529,542	$9,850,798	7,134,973	9,420,889	3,644,928	4,089,507	962,898

TABLE XXXII.—RELIGIOUS STATISTICS OF THE UNITED STATES ACCORDING TO THE CENSUS OF 1850.

States and Territories.	Baptist.			Christian.			Congregational.			Dutch Reformed.		
	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.
Maine	326	$436,732	101,389	12	$14,626	4,030	180	$529,970	70,623	..	....	..
New Hampshire	193	822,956	64,671	24	30,350	7,240	176	527,340	80,831	..	....	..
Vermont	102	159,475	35,627	9	12,880	2,770	175	454,667	78,802	..	....	..
Massachusetts	266	1,460,850	114,680	30	84,450	11,020	448	3,279,089	239,142	..	....	..
Rhode Island	106	367,800	42,105	8	24,300	3,000	21	178,550	11,703	..	....	..
Connecticut	114	406,684	44,484	4	5,200	950	252	1,657,185	127,820	..	....	..
New York	781	2,253,050	335,874	65	79,650	20,300	215	779,804	102,480	233	$3,542,850	131,025
New Jersey	108	334,600	43,425	8	10,400	2,885	8	87,700	3,500	66	460,480	39,146
Pennsylvania	321	811,395	128,458	21	24,400	6,900	*10	17,250	..	7	79,500	4,640
Delaware	12	16,800	2,975	..	..	..	..	....	..	..	....	..
Maryland	45	180,710	15,950	..	..	..	..	....	..	..	....	..
Dist. of Columbia	6	29,800	3,460	..	..	..	..	....	..	..	....	..
Virginia	650	688,818	247,589	16	7,595	4,900	..	....	..	..	....	..
North Carolina	604	205,090	201,797	29	10,575	11,600	..	....	..	..	....	..
South Carolina	418	293,863	165,805	..	..	..	1	70,000	2,000	..	....	..
Georgia	879	390,801	321,663	5	12,050	1,710	1	2,700	250	..	....	..
Florida	56	25,640	11,985	..	..	..	..	....	..	..	....	..
Alabama	579	227,497	189,980	18	6,165	4,850	..	....	..	..	....	..
Mississippi	385	186,192	118,675	8	9,950	2,850	..	....	..	..	....	..
Louisiana	77	30,470	16,660	8	61,000	1,500	..	....	..	..	....	..
Texas	70	23,090	10,020	5	150	100	..	....	..	..	....	..
Arkansas	114	21,870	18,600	..	..	..	..	....	..	..	....	..
Tennessee	643	271,899	197,815	68	48,295	18,850	..	....	..	..	....	..
Kentucky	798	549,955	288,455	120	184,945	50,640	..	....	..	..	....	..
Ohio	551	621,730	185,673	90	56,155	30,190	100	207,880	41,920	5	2,600	1,150
Michigan	66	84,050	17,865	2	1,000	850	29	59,550	10,500	10	6,250	1,975
Indiana	430	212,785	138,183	187	89,790	65,841	2	8,000	1,400	5	1,800	1,275
Illinois	282	204,095	94,130	69	42,950	30,864	46	89,250	15,626	2	2,700	875
Wisconsin	49	52,500	16,814	4	1,200	875	37	61,260	11,063	2	750	550
Iowa	23	19,550	3,998	11	6,800	2,810	14	21,550	4,725	..	....	..
Missouri	304	154,480	74,725	57	43,210	19,055	..	....	..	..	....	..
California	1	5,000	400	..	..	..	..	....	..	..	....	..
Oregon	1	2,000	100	..	..	..	1	6,200	500	..	....	..
Total	9,360	11,001,127	3,248,580	868	867,056	304,630	1,716	7,987,445	801,835	330	4,096,880	180,636

States and Territories.	Episcopal.			Free.			Friends.			German Reformed.			Jewish.	
	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.
Maine	9	$52,600	4,137	22	$28,150	7,442	26	15,680	7,725	..	....	....	..	....
New Hampshire	11	41,100	4,225	2	4,000	750	75	15,200	4,700	..	....	....	..	....
Vermont	26	81,500	10,525	1	300	100	7	5,500	2,550	..	....	....	..	....
Massachusetts	54	697,250	24,195	7	12,650	1,350	40	108,600	14,423	..	....	....	1	$1,200
Rhode Island	26	248,500	11,606	2	5,000	611	18	57,800	6,870	..	....	....	1	1,000
Connecticut	101	773,875	45,150	1	800	825	5	7,150	1,025	..	....	....	2	....
New York	279	4,110,824	140,195	15	28,700	4,600	183	800,880	49,814	1	$15,000	600	14	211,000
New Jersey	52	525,409	19,647	7	7,500	2,400	52	207,100	25,545	..	....	....	..	....
Pennsylvania	136	1,483,700	57,574	28	15,450	7,950	142	662,287	61,274	212	648,110	105,799	8	45,700
Delaware	21	78,900	7,650	..	....	....	9	24,900	8,636	..	....	....	..	....
Maryland	133	610,877	60,105	6	6,100	1,350	26	114,050	7,760	22	197,800	14,800	..	....
Dist. of Columbia	8	57,500	6,400	..	....	....	1	1,000	200	..	....	....	..	....
Virginia	173	529,450	80,684	108	61,900	86,025	15	18,825	6,450	9	16,200	8,800	1	4,000
North Carolina	51	112,340	15,245	54	16,863	14,870	81	8,075	18,200	16	17,500	5,725	..	....
South Carolina	72	616,950	28,940	5	1,700	1,550	1	500	500	..	....	....	3	83,700
Georgia	20	109,910	9,325	6	2,650	1,780	2	400	500	..	....	....	..	....
Florida	10	37,800	3,810	1	400	400	..	....	....	..	....	....	..	....
Alabama	17	76,800	6,920	5	2,800	1,800	..	....	....	..	....	....	..	....
Mississippi	13	66,800	4,550	3	1,850	700	..	....	....	..	....	....	..	....
Louisiana	15	57,900	5,210	8	10,480	675	..	....	....	1	4,000	500	1	90,000
Texas	5	15,100	1,025	7	7,100	1,600	..	....	....	..	....	....	..	....
Arkansas	2	4,250	850	1	200	200	..	....	....	..	....	....	..	....
Tennessee	17	85,300	7,810	80	6,665	7,250	4	1,800	1,600	..	....	....	..	....
Kentucky	19	112,150	7,050	84	18,600	9,877	..	....	....	..	....	....	1	12,000
Ohio	79	367,425	31,975	13	9,550	5,100	94	82,175	30,866	71	71,860	26,815	3	29,000
Michigan	25	82,800	8,425	1	3,000	700	7	4,850	1,400	..	....	....	..	....
Indiana	24	74,000	7,800	10	5,700	2,750	89	60,855	44,915	5	8,500	1,150	..	....
Illinois	27	78,350	14,000	2	6,400	750	6	2,840	1,550	8	810	280	..	....
Wisconsin	19	45,750	5,140	2	250	275	..	....	....	..	....	....	..	....
Iowa	5	5,000	780	..	....	....	5	6,800	1,550	4	800	875	..	....
Missouri	11	144,600	4,500	18	4,400	2,850	..	....	....	..	....	....	2	7,000
California	1	....	....	..	....	....	..	....	....	..	....	....	..	....
Oregon	..	....	....	..	....	....	..	....	....	..	....	....	..	....
Total	1,461	11,384,210	644,598	889	268,605	115,480	728	1,718,767	287,073	844	975,080	159,336	37	415,600

* Given separately in the census as "Orthodox Congregational."

TABLE XXXII.—RELIGIOUS STATISTICS OF THE UNITED STATES, 1850.—*Continued.*

States and Territories.	Lutheran.			Mennonite.		Methodist.			Moravian.			Presbyterian.		
	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.
Maine	..	....	....	..	....	199	$268,716	59,421	..	....	....	7	$32,000	4,086
New Hamp.	..	....	....	..	....	103	175,590	32,640	..	....	....	13	71,000	6,500
Vermont	..	....	....	..	....	140	227,783	48,560	..	....	....	11	17,500	4,160
Massachus'ts	1	$11,198	....	..	....	262	934,880	94,601	..	....	....	16	82,500	8,190
Rhode Isl'd.	..	....	....	..	....	23	102,900	9,310	..	....	....	..	....	....
Connecticut.	..	....	....	..	....	185	351,550	57,775	..	....	....	17	88,700	7,500
New York	81	252,200	38,270	4	$2,050	1,231	2,886,043	481,270	3	$36,000	1,500	700	4,356,606	870,189
New Jersey.	7	28,512	2,900	..	....	312	688,850	107,350	..	....	....	149	1,225,250	81,650
Pennsylva'ia	498	1,642,656	261,502	91	82,400	907	1,726,038	341,858	86	221,350	33,015	778	2,585,250	360,000
Delaware	..	....	....	..	....	136	127,845	29,300	..	....	....	26	75,500	10,100
Maryland	40	247,950	24,700	..	....	479	837,665	181,715	..	....	....	56	376,300	22,685
D. Columbia	2	15,000	1,000	..	....	16	71,900	10,460	..	....	....	6	73,000	5,000
Virginia	50	52,445	18,750	6	5,550	1,025	725,008	343,708	8	2,550	1,500	241	571,165	104,125
N. Carolina	49	29,525	19,750	..	....	786	292,608	223,687	7	34,000	3,000	151	172,580	64,230
S. Carolina	41	109,500	14,750	..	....	484	841,168	165,740	..	....	....	136	483,175	67,765
Georgia	8	34,850	2,825	..	....	809	393,943	240,638	1	25	75	97	218,805	40,596
Florida	..	....	....	..	....	87	55,260	20,015	..	....	....	16	31,500	5,900
Alabama	1	250	200	..	....	577	276,279	169,025	..	....	....	162	222,775	58,805
Mississippi	..	....	....	..	....	454	240,265	121,083	..	....	....	143	183,085	48,316
Louisiana	..	....	....	..	....	625	236,500	33,180	..	....	....	18	149,300	9,510
Texas	..	....	....	..	....	173	58,195	34,085	..	....	....	47	20,070	8,520
Arkansas	..	....	....	..	....	168	27,070	25,745	..	....	....	52	28,275	10,731
Tennessee	12	2,600	3,400	..	....	867	381,811	249,853	..	....	....	363	367,081	135,517
Kentucky	5	20,300	2,850	..	....	530	460,755	109,060	..	....	....	224	491,303	99,106
Ohio	260	259,975	90,448	10	1,925	1,531	1,545,831	543,490	160	93,072	51,105	663	1,389,699	272,274
Michigan	12	12,625	3,205	..	....	119	142,850	33,885	1	500	200	72	142,850	22,530
Indiana	63	87,425	19,050	..	....	779	492,560	266,372	57	21,600	18,250	282	326,520	105,582
Illinois	42	40,120	16,640	..	....	455	327,640	178,450	2	350	400	206	395,180	83,129
Wisconsin	20	14,650	5,300	..	....	110	64,130	21,270	..	....	....	40	85,800	8,533
Minnesota	..	....	....	..	....	1	....	....	..	....	....	1	800	....
Iowa	5	6,950	1,030	..	....	76	43,475	14,609	3	2,200	560	38	28,350	7,855
Missouri	24	34,560	8,160	1	420	263	281,745	62,844	3	20	12	128	299,270	45,570
California	..	....	....	..	....	5	18,300	25,745	..	....	....	3	11,000	700
Oregon	..	....	....	..	....	1	22,000	500	..	....	....	1	5,000	200
Total	1,221	2,854,286	535,180	112	92,845	13,388	14,826,188	4,354,101	331	411,667	109,617	4,863	14,557,089	2,079,504

States and Territories.	Roman Catholic.			Swedenb'g'n.		Dunker.		Union.			Unitarian.			Universalist.		
	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Number of churches.	Value of church property.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.	Number of churches.	Value of church property.	Amount of church accommodation.
Maine	12	$20,700	6,650	2	$8,000	..	....	73	$93,650	23,539	15	$108,000	10,144	60	$121,601	21,043
New Hamp.	2	20,000	1,450	..	....	..	....	32	39,350	10,540	13	72,800	8,880	38	83,100	14,280
Vermont	8	42,200	4,305	..	....	..	....	76	107,950	31,010	2	32,000	1,000	38	74,100	14,775
Massachus'ts	41	477,500	32,165	6	66,000	..	....	6	9,550	1,810	163	2,320,147	92,938	123	643,876	51,089
Rhode Isl'd.	7	72,500	7,300	2	4,400	..	....	4	5,000	2,450	4	127,000	2,950	4	55,000	2,230
Connecticut.	12	97,500	9,015	..	....	..	....	4	28,400	1,850	5	42,000	1,750	22	90,200	8,905
New York	176	1,569,875	126,288	2	1,400	..	....	75	110,300	27,529	22	292,075	10,225	114	327,400	55,570
New Jersey.	23	133,385	9,485	..	....	2	$1,800	5	6,500	1,450	2	1,500	450	8	6,800	1,000
Pennsylva'ia	140	1,084,204	89,501	3	11,700	15	11,700	78	77,925	27,700	4	28,000	1,630	22	86,800	9,783
Delaware	3	15,000	1,630	..	....	..	....	1	1,000	200	..	....	....	..	....	....
Maryland	65	1,161,532	81,100	..	....	..	....	..	....	....	..	....	....	..	....	....
D. Columbia	6	105,300	7,100	..	....	..	....	..	....	....	1	10,000	500	..	....	....
Virginia	17	126,100	7,930	1	500	8	8,200	52	24,025	13,250	..	....	....	1	500	200
N. Carolina	4	5,900	1,400	..	....	1	100	4	650	1,200	..	....	....	..	....	....
S. Carolina	14	78,315	6,030	..	....	..	....	..	....	....	1	30,000	700	8	6,000	950
Georgia	8	79,500	4,250	..	....	..	....	16	21,100	7,250	..	....	....	3	1,000	900
Florida	5	13,600	1,850	..	....	..	....	..	....	....	..	....	....	..	....	....
Alabama	5	300,000	5,200	..	....	..	....	4	1,650	1,125	1	6,000	100	3	400	715
Mississippi	9	67,000	3,250	..	....	..	....	1	400	180	..	....	....	..	....	....
Louisiana	55	1,045,650	37,780	..	....	..	....	6	8,220	1,350	..	....	....	1	100,000	1,000
Texas	13	79,700	6,760	..	....	..	....	2	525	850	..	....	....	..	....	....
Arkansas	7	6,650	1,600	..	....	..	....	5	1,000	1,800	..	....	....	..	....	....
Tennessee	4	45,000	1,400	..	....	1	300	15	8,800	8,900	..	....	....	..	....	....
Kentucky	48	336,910	24,240	..	....	1	200	30	17,000	10,900	1	15,000	700	7	11,650	2,200
Ohio	130	763,307	76,215	2	151,800	15	9,975	48	87,900	18,646	1	15,000	650	53	100,590	20,765
Michigan	44	159,775	16,122	..	....	..	....	3	1,400	800	..	....	....	7	7,100	1,360
Indiana	63	167,725	25,115	..	....	5	3,100	5	2,350	1,250	1	600	250	15	17,800	5,050
Illinois	59	220,400	29,100	2	5,800	4	2,250	30	30,550	8,625	4	18,700	1,050	7	13,800	2,000
Wisconsin	64	66,685	24,967	..	....	..	....	1	800	400	..	....	....	6	3,000	665
Minnesota	1	100	100	..	....	..	....	..	....	....	..	....	....	..	....	....
Iowa	18	28,250	4,490	..	....	..	....	3	7,100	502	..	....	....	1	1,600	200
Missouri	68	497,575	33,950	..	....	..	....	11	6,220	2,350	2	70,000	2,100	1	500	250
California	18	233,500	7,500	..	....	..	....	..	....	....	..	....	....	..	....	....
Oregon	5	41,320	1,833	..	....	..	....	..	....	....	..	....	....	..	....	....
New Mexico	73	94,100	28,650	..	....	..	....	..	....	....	..	....	....	..	....	....
Total	1,227	9,256,758	675,721	20	113,600	52	37,625	590	644,315	201,864	242	3,173,822	136,417	532	1,756,816	214,965

Table XXXII.—Religious Statistics of the United States, 1850.—*Continued.*

States and Territories.	Minor sects.			Totals.			Miscellaneous statistics of churches.						
	Number of churches.	Value of church property.	Amount of church accommodation.	Total number of churches.	Total value of church property, corrected.	Total amount of church accommodations, corrected.	Population to square mile.	Accommodations to square mile.	No. of churches to every 100 square miles.	Average value of churches.	Average accommodation of churches.	Churches to every 1,000 of total population.	Seats per 1,000 of total population.
Maine	2	$400	300	945	$1,794,209	325,997	18.36	10.26	2.97	$1,899	345	1.62	559
New Hampshire	4	3,000	1,100	626	1,433,266	239,325	34.26	25.79	6.75	2,290	382	1.97	753
Vermont	4	800	850	599	1,251,655	237,544	34.69	23.26	5.87	2,090	430	1.91	756
Massachusetts	13	17,450	4,430	1,477	10,504,888	695,188	127.50	89.13	18.44	7,112	471	1.49	699
Rhode Island	5	4,650	1,780	231	1,293,600	103,384	141.06	79.16	17.69	5,600	448	1.57	701
Connecticut	10	6,000	1,300	734	3,599,330	309,409	78.89	66.20	15.70	4,904	422	1.98	834
New York	25	55,500	9,350	4,169	21,539,561	1,917,479	65.90	40.80	8.87	5,167	460	1.35	619
New Jersey	10	5,700	2,150	814	3,712,863	350,474	58.84	42.12	9.78	4,561	431	1.66	716
Pennsylvania	89	240,500	30,837	3,596	11,853,291	1,581,085	50.26	34.38	7.82	3,296	440	1.56	684
Delaware	2	400	250	180	340,345	55,741	43.18	26.25	8.49	1,891	310	1.97	609
Maryland	37	264,900	19,350	909	3,974,116	379,465	52.41	34.11	8.17	4,372	417	1.56	651
Dist. of Columbia	..	....	....	46	363,000	34,129	861.45	568.67	76.67	7,891	742	0.89	660
Virginia	5	13,550	1,825	2,386	2,902,220	858,806	23.17	14.00	3.89	1,216	360	1.68	604
North Carolina	..	....	....	1,737	907,785	577,185	19.31	11.38	3.52	508	323	2.06	664
South Carolina	8	57,375	3,320	1,182	2,181,476	460,450	22.13	15.67	4.02	1,846	390	1.77	689
Georgia	7	1,625	1,275	1,862	1,327,112	640,560	15.62	11.04	3.21	713	344	2.05	707
Florida	2	1,200	1,000	177	192,600	44,960	1.48	0.76	0.30	1,088	254	2.02	514
Alabama	3	12,000	1,000	1,375	1,244,741	443,708	15.21	8.75	2.71	905	323	1.78	575
Mississippi	..	....	....	1,016	832,622	294,104	12.86	6.24	2.15	820	289	1.68	485
Louisiana	2	59,000	1,650	307	1,940,495	111,063	12.55	2.69	0.74	6,321	362	0.59	214
Texas	6	3,000	1,695	328	408,944	74,325	0.89	0.31	0.14	1,247	226	1.54	350
Arkansas	13	....	1,200	362	149,686	67,914	4.02	1.34	0.69	413	188	1.72	324
Tennessee	3	2,150	1,600	2,027	1,246,951	632,551	21.99	13.87	4.45	615	312	2.02	631
Kentucky	31	24,150	8,150	1,849	2,295,353	676,456	26.07	17.95	4.91	1,241	366	1.88	689
Ohio	60	111,650	21,332	3,939	5,860,059	1,457,769	49.55	36.48	9.86	1,488	370	1.99	756
Michigan	1	15,000	800	399	793,180	128,838	7.07	2.29	0.71	1,988	323	1.63	324
Indiana	13	4,025	2,822	2,035	1,568,906	718,419	29.24	21.25	6.02	771	353	2.06	727
Illinois	25	11,550	7,740	1,223	1,532,305	488,172	15.37	8.81	2.21	1,253	399	1.44	573
Wisconsin	11	7,125	1,921	365	512,552	97,773	5.66	1.81	0.68	1,404	268	1.20	320
Minnesota	..	....	....	3	1,350	300	0.04	....	....	450	100	0.49	49
Iowa	1	....	100	207	235,412	44,604	3.77	0.88	0.41	1,137	215	1.08	232
Missouri	21	43,430	7,850	909	1,730,135	270,028	10.12	4.01	1.35	1,903	297	1.83	396
California	..	....	....	28	288,400	10,984	0.60	0.07	0.02	10,300	392	0.30	119
Oregon	..	....	....	9	76,520	3,133	0.07	0.02	....	8,502	348	0.68	236
Utah	9	51,000	4,200	9	....	....	0.04	....	....	....	...	....	...
New Mexico	..	....	....	73	94,100	28,650	0.28	0.14	0.04	1,289	392	1.19	466
Total	422	1,017,130	141,177	38,183	89,988,028	14,360,038	8.23	4.89	1.30	2,357	376	1.65	619

States and Territories.	Amount of population to each church of the denominations named.					
	Methodist.	Baptist.	Presbyterian.	Episcopal.	Catholic.	Other sects.
Maine	2,930	1,789	83,310	64,797	48,597	1,488
N. Hampshire	3,087	1,648	24,460	28,907	158,988	1,046
Vermont	2,244	3,080	28,556	12,082	39,265	2,120
Massachusetts	3,796	3,739	62,157	18,417	24,256	1,187
Rhode Island	6,415	1,392	....	5,675	21,078	2,138
Connecticut	2,004	3,252	21,811	3,671	30,899	1,216
New York	2,516	3,966	4,425	11,102	17,599	3,091
New Jersey	1,569	4,533	3,286	9,415	21,285	2,880
Pennsylvania	2,549	7,202	2,971	16,998	16,513	1,759
Delaware	864	7,628	3,520	4,359	30,511	7,628
Maryland	1,217	12,956	10,411	4,384	8,970	4,451
D. Columbia	3,230	8,614	8,614	6,461	8,614	12,922
Virginia	1,387	2,187	5,899	8,218	83,627	5,077
N. Carolina	1,106	1,439	5,755	17,041	217,260	4,550
S. Carolina	1,381	1,619	4,915	9,285	47,750	10,611
Georgia	1,120	1,031	9,342	45,309	113,273	18,494
Florida	1,005	1,562	5,465	8,744	17,489	29,148
Alabama	1,337	1,333	4,763	45,390	154,325	22,046
Mississippi	1,336	1,575	4,241	46,656	67,392	50,544
Louisiana	4,142	6,724	28,765	34,517	9,414	30,457
Texas	1,229	3,087	4,523	42,518	16,358	10,630
Arkansas	1,249	1,841	4,036	104,948	29,985	11,047
Tennessee	1,157	1,547	2,762	58,983	250,679	7,834
Kentucky	1,854	1,231	4,386	51,706	20,467	4,271
Ohio	1,293	3,594	2,987	25,067	15,233	2,010
Michigan	3,342	6,025	5,523	15,906	9,038	5,447
Indiana	1,269	2,299	3,505	41,184	15,689	2,163
Illinois	2,102	3,019	4,133	31,536	14,432	3,490
Wisconsin	2,776	6,242	7,635	16,073	4,772	3,680
Minnesota	6,077	6,000	6,077	....	6,077	....
Iowa	2,529	8,357	5,058	38,443	10,679	4,090
Missouri	2,593	2,244	5,328	62,004	10,030	5,052
California	18,519	92,597	30,865	92,597	5,144	....
Oregon	13,294	13,294	13,294	....	2,659	13,294
Utah	....	....	....	....	....	1,264
New Mexico	....	....	....	....	843	....
Average	1,739	2,478	4,769	15,874	18,901	2,923

Table XXXIII.—Religious Denominations in 1860.

Names.	Churches.	Ministers.	Members.
African Methodists	....	193	26,745
Baptists: Regular	12,578	8,970	1,036,756
Anti-Mission	1,800	850	60,000
Seventh-Day	56	75	6,736
Six Principle	18	16	3,000
Freewill	1,298	1,246	61,441
River Brethren	80	65	7,000
Winebrennarians	275	140	14,000
Dunkers	160	250	8,700
Mennonites	300	250	36,280
Disciples (Campbellites)	2,000	2,000	*350,000
Christians (Unitarian)	2,200	1,500	*180,000
Congregationalists, Orthodox	2,676	2,531	257,634
" Unitarian	251	297	*30,000
Episcopal	2,045	2,079	160,000
Friends, Orthodox	....	....	*54,000
" Hicksite	....	....	*40,000
German Evangelical	....	1,150	88,000
German Reformed	1,020	360	79,000
Jews	170	....	200,000
Lutherans	2,017	1,134	232,780
Methodists: Episcopal	9,922	†6,984	988,523
M. E. Church, South	....	‡2,591	499,694
Protestant	1,400	2,200	99,000
Wesleyan	523	565	21,000
Mormons	....	....	61,000
Presbyterians: Old School	2,767	3,684	300,814
New School	....	....	....
Cumberland	1,188	927	84,249
United	634	408	55,547
Associate Reformed	....	94	2,000
Protestant Reformed Dutch	409	410	50,304
Roman Catholic	2,517	2,317	§3,177,140
Second Advent	....	....	20,000
Shakers	....	....	4,700
Swedenborgians	57	49	1,850
United Brethren (Moravians)	32	46	8,275
United Brethren in Christ	918	1,278	82,013
Universalists	1,202	693	§600,000

* Estimated. † Beside 8,359 local preachers. ‡ Beside 4,984 local preachers.
§ Estimated population adhering to their doctrines.

TABLE XXXIV.—STATISTICS OF NEWSPAPERS AND PERIODICALS IN 1850 AND 1860.*

States.	Daily.				Tri-weekly and semi-weekly.				Weekly.				Semi-monthly and monthly.			
	1850.		1860.		1850.		1860.		1850.		1860.		1850.		1860.	
	No.	Copies annually.	No.	Circulation.	No.	Copies annually.	No.	Circulation.	No.	Copies annually.	No.	Circulation.	No.	Copies annually.	No.	Circulation.
Me.	4	964,040	7	8,141	5	302,900	4	3,978	39	2,906,124	52	95,510	1	30,000	6	18,540
N. H.	..	....	..	....	..	....	..	....	35	3,538,152	20	19,700	3	29,400	..	....
Vt.	2	172,150	2	750	1	228,800	..	....	30	2,142,712	28	44,665	2	24,000	1	2,000
Mass.	22	40,498,444	17	169,600	15	2,421,016	17	43,100	126	20,371,104	145	778,680	32	1,419,000	36	353,100
R. I.	5	1,768,450	5	10,300	2	25,200	1	2,000	12	963,300	19	35,990	..	....	1	1,400
Conn.	7	1,752,800	14	19,100	4	374,400	1	400	30	2,117,232	37	68,436	1	6,000	1	500
N. Y.	51	63,928,685	74	487,340	21	3,892,460	17	77,771	308	39,205,920	366	2,600,925	45	8,333,808	69	2,045,000
N. J.	6	2,175,350	15	18,510	..	....	1	1,000	43	1,900,288	70	131,500	2	23,040	3	10,000
Penn.	24	50,416,788	29	233,550	3	140,400	4	13,700	261	27,359,384	297	700,961	19	6,972,000	28	464,684
Del.	..	....	..	....	3	62,400	4	3,294	7	858,800	10	12,850	..	....	..	....
Md.	6	15,806,500	6	53,200	4	499,700	2	6,146	54	3,166,124	49	62,898	4	140,400	..	....
D. C.	5	6,149,198	5	32,910	5	1,208,610	3	7,600	8	3,769,428	4	26,000	..	....	..	....
Va.	15	4,992,350	15	44,400	12	1,416,550	16	23,962	55	2,518,568	103	189,300	4	291,600	5	48,900
N. C.	..	....	8	3,550	5	414,310	5	2,362	40	1,530,204	57	65,612	6	76,050	4	7,850
S. C.	7	5,070,600	2	1,600	5	549,250	4	6,200	27	1,413,880	35	41,070	5	102,600	3	4,500
Ga.	5	1,086,110	12	18,650	3	146,380	6	4,500	37	2,609,776	73	127,822	6	228,600	13	29,500
Fla.	..	....	..	....	1	81,200	3	3,900	9	288,600	19	11,600	..	....	..	....
Ala.	6	869,201	9	8,820	5	266,500	7	3,286	48	1,509,040	77	74,289	1	18,000	3	7,200
Miss.	..	....	5	15,370	4	245,440	3	7,500	46	1,507,064	65	65,867	..	....	..	....
La.	11	9,947,140	8	41,000	6	676,000	3	1,850	37	1,646,684	70	77,800	1	146,400	..	....
Texas	..	....	3	5,360	5	525,400	3	9,288	29	771,524	79	90,615	..	....	4	2,775
Ark.	..	....	..	....	..	....	..	1,000	9	377,000	37	38,812	..	....	..	....
Tenn.	8	4,407,666	8	11,300	2	266,240	7	4,509	36	2,139,644	61	101,839	4	127,200	4	43,760
Ky.	9	2,243,584	4	19,500	7	1,125,280	4	4,750	38	3,053,024	64	123,947	8	160,950	5	31,400
Ohio	26	14,285,633	24	84,560	10	1,047,930	12	7,712	201	13,334,204	260	805,810	23	1,781,640	41	218,850
Mich.	3	1,252,000	8	14,150	2	52,000	4	18,150	47	1,685,736	103	92,648	6	258,000	3	3,900
Ind.	9	1,153,092	13	8,881	2	195,000	5	1,600	95	2,920,736	160	134,600	1	48,000	8	14,300
Ill.	8	1,120,540	23	38,100	4	214,500	8	3,962	84	3,575,936	238	282,997	10	190,400	17	31,100
Wis.	6	1,053,245	14	14,125	4	198,250	8	3,220	35	1,395,992	130	111,400	1	18,000	3	10,400
Minn.	..	....	4	2,524	..	....	..	....	..	....	45	30,030	..	....	..	....
Iowa	..	....	9	7,700	2	577,200	4	1,095	25	923,000	112	76,945	2	12,600	5	3,400
Mo.	5	3,380,400	16	44,550	4	273,000	3	7,800	45	2,406,560	143	277,357	7	135,000	11	24,300
Kan.	..	....	3	1,650	..	....	..	....	..	....	24	20,270	..	....	..	....
Cal.	4	626,000	22	58,444	..	....	5	5,600	3	135,200	89	131,249	..	....	5	34,600
Oregon	..	....	2	800	..	....	..	....	2	58,968	12	14,820	..	....	1	4,000
Total	254	235,119,966	386	1,478,435	146	17,376,316	164	281,235	1,901	153,099,908	3,153	7,564,814	194	20,573,288	280	3,414,959

States.	Quarterly.				Literary and Miscellaneous.			Neutral and Independent.		Political.			Religious.			Aggregate.			
	1850.		1860.		1850.		1860	1850.		1850.		1860.	1850.		1860.	1850.		1860.	
	No.	Copies ann'lly.	No.	Circulation.	No.	Circulation.	No.	No.	Circulation.	No.	Circulation.	No.	No.	Circulation.	No.	No.	Circulation.	No.	Circulation.
Me.	..	....	..	....	16	25,758	16	..	....	29	29,695	48	4	8,434	6	49	63,887	70	126,169
N. H.	..	....	..	....	11	12,490	2	..	....	22	32,186	17	5	15,500	1	38	60,176	20	19,700
Vt.	..	....	..	....	5	5,550	1	..	....	27	33,990	26	3	6,416	4	35	45,956	31	47,413
Mass.	7	24,000	6	21,500	94	377,232	78	9	50,700	82	171,387	112	24	117,650	31	209	716,969	221	1,868,980
R. I.	..	....	..	....	6	5,400	8	1	2,500	12	18,075	18	..	....	..	19	25,975	26	49,690
Conn.	2	8,800	2	7,100	13	12,400	7	..	....	28	34,916	45	4	5,400	3	46	53,116	55	95,536
N. Y.	3	24,600	10	57,600	113	588,408	119	15	127,370	263	899,755	363	37	507,246	54	428	1,622,779	536	5,268,631
N. J.	..	....	..	....	6	4,010	8	1	300	44	40,144	79	..	....	2	51	44,454	89	161,016
Penn.	2	7,600	6	6,800	72	446,864	46	12	70,396	198	267,940	277	28	198,018	41	310	983,218	364	1,419,695
Del.	..	....	..	....	2	900	1	..	....	8	6,600	13	..	....	..	10	7,500	14	16,144
Md.	..	....	..	....	22	78,000	..	1	700	39	31,637	57	6	13,950	..	68	124,287	57	122,244
D. C.	..	....	1	3,000	2	1,575	..	1	350	15	99,437	13	..	....	..	18	101,362	18	69,510
Va.	1	4,000	..	....	11	7,690	9	5	4,200	62	51,988	117	9	25,256	13	87	89,134	139	301,622
N. C.	..	....	..	....	8	5,675	8	2	875	35	24,564	60	6	5,725	6	51	36,839	74	79,374
S. C.	2	9,600	1	500	12	14,700	9	5	8,300	24	28,115	33	5	4,600	3	46	55,715	45	53,870
Ga.	..	....	1	1,000	22	38,938	26	6	3,046	20	20,900	75	3	4,600	4	51	67,484	105	180,922
Fla.	..	....	..	....	..	....	2	..	....	7	3,500	20	3	2,250	..	10	5,750	22	15,500
Ala.	..	....	..	....	12	5,811	5	1	1,000	45	24,336	89	2	3,450	2	60	34,597	96	93,595
Miss.	..	....	..	....	10	4,490	2	..	....	40	26,380	70	..	....	1	50	30,870	78	88,737
La.	..	....	..	....	14	22,325	11	6	12,000	34	45,522	68	1	1,000	2	55	80,847	81	120,650
Texas	..	....	..	....	17	6,737	14	1	1,400	14	8,350	71	2	2,650	4	34	19,137	89	108,038
Ark.	..	....	..	....	3	3,300	1	..	....	6	3,950	34	..	....	2	9	7,250	37	39,812
Tenn.	..	....	2	3,500	5	10,350	6	2	1,610	36	33,147	66	7	22,770	10	50	67,877	82	164,908
Ky.	..	....	..	....	13	15,425	7	2	800	42	55,936	65	5	12,525	5	62	84,686	77	179,597
Ohio	1	24,000	..	....	42	122,190	46	6	13,485	192	189,304	256	21	90,130	35	261	415,109	337	1,116,932
Mich.	..	....	..	....	15	18,125	5	1	200	39	28,793	109	3	5,600	4	58	52,718	118	118,936
Ind.	..	....	..	....	21	12,452	8	..	....	84	47,900	172	2	3,000	6	107	63,852	186	159,381
Ill.	1	900	..	....	25	24,125	16	1	1,290	73	51,111	259	8	12,097	11	107	88,623	286	355,159
Wis.	..	....	..	....	4	4,000	5	..	....	42	29,236	149	..	....	1	46	33,236	155	139,145
Minn.	..	....	..	....	..	....	1	..	....	..	....	47	..	....	1	..	....	49	32,554
Iowa	..	....	..	....	2	1,000	10	1	1,200	25	20,150	119	1	650	1	29	23,000	130	89,240
Mo.	..	....	..	....	17	19,400	21	..	....	42	48,340	141	2	2,740	11	61	70,480	173	354,907
Kan.	..	....	..	....	..	....	3	..	....	..	....	24	..	....	..	..	....	27	21,920
Cal.	..	....	..	....	3	2,600	19	4	2,000	..	....	96	..	....	6	7	4,600	121	229,893
Oregon	.	....	..	....	1	624	1	..	....	1	570	13	..	....	1	2	1,134	15	19,621
Total	19	103,500	29	101,000	619	1,898,544	521	83	303,722	1,630	1,907,794	3,221	191	1,071,657	271	2,526	5,182,117	4,018	12,829,061

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* For convenience, the territories are omitted. The whole number of semi-weekly papers in 1850 was 31, and their circulation about 55,000; in 1860 their number was 79, and their circulation 175,165. Beside the above there were in 1860 16 annual periodicals reported, having an aggregate circulation of 807,750.

TABLE XXXV.—ANNUAL REVENUE AND EXPENDITURES FROM MARCH 4, 1789, TO JUNE 30, 1861.*

Years.	From customs.	From public lands.	From miscellaneous sources, including loans and treasury notes.	Total receipts.	Total expenditures.
1789 } 1791 } †	$4,399,473	....	$5,810,552	$10,210,025	$7,207,539
1792...	3,443,070	....	5,297,695	8,740,766	9,141,569
1793...	4,255,306	....	1,465,317	5,720,624	7,529,575
1794...	4,801,065	....	5,240,036	10,041,101	9,302,124
1795...	5,588,461	....	3,831,341	9,419,802	10,435,069
1796...	6,567,987	$4,836	2,167,505	8,740,329	8,367,776
1797...	7,549,649	83,540	1,125,726	8,758,916	8,626,012
1798...	7,106,061	11,963	1,091,045	8,209,070	8,613,517
1799...	6,610,449	....	6,011,010	12,621,459	11,077,043
1800...	9,080,932	443	3,369,807	12,451,184	11,989,739
1801...	10,750,778	167,726	2,026,950	12,945,455	12,273,376
1802...	12,438,235	188,628	2,374,527	15,001,391	13,276,084
1803...	10,479,417	165,675	419,004	11,064,097	11,258,983
1804...	11,098,565	487,526	249,747	11,835,840	12,624,646
1805...	12,936,487	540,193	212,827	13,689,508	13,727,124
1806...	14,667,698	765,245	175,884	15,608,828	15,070,093
1807...	15,845,521	466,163	86,334	16,398,019	11,292,292
1808...	16,363,550	647,939	51,054	17,062,544	16,764,584
1809...	7,296,020	442,252	35,200	7,773,473	13,867,226
1810...	8,583,309	696,548	2,864,348	12,144,206	13,319,986
1811...	13,313,222	1,040,237	78,377	14,431,838	13,601,808
1812...	8,958,777	710,427	12,969,827	22,639,032	22,279,121
1813...	13,224,623	835,655	26,464,566	40,524,844	39,190,520
1814...	5,998,772	1,135,971	27,424,793	34,559,536	38,028,230
1815...	7,282,942	1,287,959	42,390,336	50,961,237	39,582,493
1816...	36,306,874	1,717,985	19,146,561	57,171,421	48,244,495
1817...	26,283,348	1,991,226	5,559,017	33,833,592	40,877,646
1818...	17,176,385	2,606,564	1,810,986	21,593,936	35,104,875
1819...	20,283,608	3,274,422	1,047,633	24,605,665	24,004,199
1820...	15,005,612	1,635,871	4,240,009	20,881,493	21,763,024
1821...	13,004,447	1,212,966	5,356,290	19,573,703	19,090,572
1822...	17,589,761	1,803,581	839,084	20,232,427	17,676,592
1823...	19,088,433	916,523	535,709	20,540,666	15,314,171
1824...	17,878,325	984,418	5,518,468	24,381,212	31,898,538
1825...	20,098,713	1,216,090	5,526,054	26,840,858	23,585,804
1826...	23,341,331	1,393,785	525,317	25,260,434	24,103,398
1827...	19,712,283	1,495,845	1,758,235	22,966,363	22,656,764
1828...	23,205,523	1,018,308	539,796	24,763,629	25,459,479
1829...	22,681,965	1,517,175	628,486	24,827,627	25,044,358
1830...	21,922,391	2,329,356	592,368	24,844,116	24,585,281
1831...	24,224,441	3,210,815	1,091,563	28,526,820	30,038,446
1832...	28,465,237	2,623,381	776,942	31,865,561	34,356,698
1833...	29,032,508	3,967,682	948,234	33,948,426	24,257,298
1834...	16,214,957	4,857,600	719,377	21,791,935	24,601,982
1835...	19,391,310	14,757,600	1,281,175	35,430,087	17,573,141
1836...	23,409,940	24,877,179	2,539,675	50,826,796	30,868,164
1837...	11,169,290	6,776,236	9,938,326	27,883,853	37,265,037
1838...	16,158,800	3,081,939	19,778,642	39,019,382	39,455,438
1839...	23,137,924	7,076,447	5,125,653	33,881,242	37,614,936
1840...	13,499,502	3,292,285	8,240,405	25,032,193	28,226,533
1841...	14,487,216	1,365,627	14,666,633	30,519,477	31,797,530
1842...	18,187,908	1,335,797	15,250,038	34,773,744	32,936,876
1843‡..	7,046,843	897,818	12,837,748	20,782,410	12,118,105
1844...	26,183,570	2,059,939	2,955,044	31,198,555	33,642,010
1845...	27,528,112	2,077,022	336,718	29,941,853	30,490,408
1846...	26,712,667	2,694,452	292,847	29,699,967	27,632,282
1847...	23,747,864	2,498,355	29,091,948	55,338,168	60,520,851
1848...	31,757,070	3,328,642	21,906,765	56,992,479	60,655,143
1849...	28,346,738	1,688,959	29,761,194	59,796,892	56,386,422
1850...	39,668,686	1,859,894	6,120,808	47,649,388	44,604,718
1851...	49,017,567	2,352,305	1,392,831	52,762,704	48,476,104
1852...	47,339,326	2,043,239	510,549	49,893,115	46,712,608
1853...	58,931,865	1,667,084	901,152	61,500,102	54,577,061
1854...	64,224,190	8,470,798	1,107,302	73,802,291	75,473,119
1855...	53,025,794	11,497,049	828,531	65,351,374	66,164,775
1856...	64,022,863	8,917,644	1,116,391	74,056,899	72,726,341
1857...	63,875,905	3,829,486	1,263,820	68,969,212	71,274,587
1858...	41,789,620	3,513,715	25,069,329	70,372,665	82,062,186
1859...	49,565,824	1,756,687	30,451,453	81,773,965	83,678,642
1860...	53,187,511	1,778,557	21,875,338	76,841,407	77,055,125
1861...	39,582,125	870,658	33,206,693	86,835,900	84,578,834
Total	1,575,152,579	175,817,961	558,240,987	2,270,929,166	2,235,677,161

TABLE XXXVI.—ANNUAL AMOUNT OF AND DISBURSEMENT FOR PUBLIC DEBT FROM 1791 TO 1861.*

Years.	Public debt.	Interest and reimbursement of the domestic debt.	Interest on the public debt.	Redemption of the public debt.
1789 } 1791 } †	$75,463,476	$1,140,177	$37,685	$699,984
1792...	77,227,924	2,373,611	....	4,711,405
1793...	80,352,634	2,079,105	18,753	2,672,048
1794...	78,427,404	2,455,856	296,666	2,874,356
1795...	80,747,587	2,727,959	219,099	2,985,742
1796...	83,762,172	2,914,847	324,500	2,685,658
1797...	82,064,479	2,879,976	292,540	2,708,682
1798...	79,228,529	2,726,238	229,637	1,004,518
1799...	78,408,669	2,599,251	216,400	1,706,578
1800...	82,976,294	3,186,201	216,400	1,138,563
1801...	83,038,050	4,213,430	198,400	2,879,876
1802...	80,712,632	4,077,147	162,025	5,293,225
1803...	77,054,686	3,949,462	32,000	3,224,697
1804...	86,427,120	3,977,206	592,031	3,598,017
1805...	82,312,150	3,318,141	751,707	3,171,225
1806...	75,723,270	5,572,018	485,216	2,838,752
1807...	69,218,398	4,183,890	509,098	1,614,730
1808...	65,196,317	7,701,288	600,633	1,956,440
1809...	57,023,192	3,852,896	688,923	1,910,734
1810...	53,173,217	4,835,241	844,674	2,318,996
1811...	48,005,587	2,010,656	654,802	5,334,540
1812...	45,209,737	1,098,488	627,051	2,724,062
1813...	55,962,827	1,948,639	806,740	3,352,742
1814...	81,487,846	1,712,897	216,835	5,970,811
1815...	99,833,660	3,343,268	793,366	8,492,293
1816...	127,334,933	4,527,779	699,730	19,643,552
1817...	123,491,965	5,442,503	344,019	19,636,513
1818...	103,466,633	5,506,814	190,743	2,006,367
1819...	95,529,648	7,355,167	46,720	13,894,814
1820...	91,015,566	5,465,995	188,133	2,974,364
1821...	89,987,427	5,623,321	36,560	2,707,211
1822...	93,546,676	5,739,760	....	2,109,138
1823...	90,875,877	5,524,034	....	5,988
1824...	90,269,777	5,301,104	....	11,267,289
1825...	83,788,432	....	4,366,757	7,728,578
1826...	81,054,059	....	3,975,542	7,065,539
1827...	73,987,357	....	3,486,071	6,517,596
1828...	67,475,043	....	3,098,800	9,064,637
1829...	58,421,413	....	2,542,843	9,841,024
1830...	48,565,406	....	1,912,574	9,443,173
1831...	39,123,191	....	1,373,748	14,800,629
1832...	24,322,235	....	772,561	17,067,747
1833...	7,001,032	....	303,796	1,239,746
1834...	4,760,082	50	202,152	5,974,362
1835...	351,289	....	57,863	330
1836...	291,089	....	....	....
1837...	1,878,223	27	....	21,824
1838...	4,857,660	2,000	14,997	5,588,711
1839...	11,983,737	3,000	399,834	10,715,158
1840...	5,125,077	2,000	174,635	3,909,977
1841...	6,737,398	2,261	288,063	5,310,365
1842...	15,028,486	5,000	773,550	7,896,989
1843‡..	27,203,450	5,000	523,584	353,011
1844...	24,748,188	44,548	1,833,484	11,118,870
1845...	17,093,794	26,031	1,040,953	7,509,822
1846...	16,750,926	22,649	843,228	347,945
1847...	38,956,623	6,956	1,119,246	5,593,078
1848...	48,526,379	4,767	2,391,652	13,031,368
1849...	64,704,693	4,500	3,565,535	12,799,679
1850...	64,228,238	2,000	3,782,406	3,654,321
1851...	62,560,395	2,333	3,701,979	652,123
1852...	65,131,692	1,359	4,000,654	2,150,576
1853...	67,340,628	....	3,665,551	6,412,555
1854...	47,242,206	....	3,066,646	18,269,718
1855...	39,969,731	....	2,314,464	6,666,165
1856...	30,963,909	23	1,954,708	10,052,099
1857...	29,060,386	8	1,593,765	4,284,686
1858...	44,910,777	....	1,652,055	7,544,568
1859...	58,754,699	....	14,713,572	2,638,664
1860...	64,769,703	....	3,144,620	18,900,892
1861...	90,867,828	....	4,000,173	18,221,708
Total	....	131,498,893	94,023,479	424,516,447

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* Fractions omitted in the several years, but included in the totals. † From March 4, 1789, to Dec. 31, 1791.
‡ To June 30, on which day the fiscal year of the government has since closed.

UNITED STATES, LITERATURE OF THE. The literary history of the United States may be treated under three distinctly marked periods, viz.: a colonial or ante-revolutionary period (from 1620 to 1775), during which the literature of the country was closely assimilated in form and character to that of England; a first American period (from 1775 to 1820), which witnessed the transition from a style for the most part imitative to one national or peculiar, as a consequence of the revolutionary struggle and of the ideas generated by it; and a second American (from 1820 to the present time), in which the literature of the country assumed a decided character of originality, not yet fully developed.—I. 1620 to 1775. The first literary production of any note emanating from the British American colonies was the version of Ovid's "Metamorphoses" made by George Sandys on the banks of the James river about 1620, and published in London in 1626. But notwithstanding that men of letters were found everywhere among the early colonists, in New England alone, where in 1638 the first printing press was established in Cambridge, was any considerable progress in literary culture made, and the literature of the first or colonial period was chiefly confined to that locality or was indirectly connected with it. The earliest development, owing to the religious character of the people, to the causes which led to their emigration, and to the fact that during the first century after the settlement of the country the clergy were the best informed and educated class, was theological. The "Bay Psalm Book" (Cambridge, 1640), the first book printed in the country, though not strictly original, became very popular both in America and Great Britain, and within a little more than a century passed through not fewer than 70 editions in both hemispheres. In the same year appeared a volume of poems by Mrs. Anne Bradstreet (1612–'72), which was the first original work published in New England. The colonial press however speedily became monopolized by religious writers, and among its most remarkable succeeding productions were the Indian Bible of John Eliot (1604–'90), the first edition of the Scriptures published in America, and an extraordinary monument of patience and industry, though now of interest only to the antiquary; the "Concordance of the Scriptures," by John Newman, which was the earliest work of its kind, and the immediate precursor of Cruden's Concordance; and the prolific writings of Increase and Cotton Mather (1663–1728), the latter of whom was the author of no fewer than 383 works, of most of which not even the titles are remembered. The most celebrated are the "Wonders of the Invisible World" and the *Magnalia Christi Americana*, an ecclesiastical history of New England from 1620 to 1698, containing biographies of several colonial worthies. Cotton Mather creditably represented the colonies in respect to erudition, but his style is quaint and uncouth, and his name is inseparably connected with the gloomy history of witchcraft in New England. To the early colonial times also belong John Cotton (1585–1652), one of the first ministers of Boston; Thomas Hooker (1586–1647); Roger Williams (1606–'83), the founder of Rhode Island; John Davenport (1598–1670), Charles Chauncy (1592–1672), and John Norton (1606–'63), eminent in their day as theological writers, but whose works are now but little known. The establishment of Harvard college in 1636, and of William and Mary and Yale colleges in the last decade of the 17th century, together with the practice, which became common with many of the wealthier colonists, of sending their sons to England to be educated, meanwhile showed its effects in the gradual improvement of style and in the more discursive aims of writers. But theology was still the department of letters most generally cultivated, and among theologians Jonathan Edwards (1703–'58), whose power of subtle argument Sir James Mackintosh declares to be "perhaps unmatched, certainly unsurpassed among men," was the first not only in America, but, according to Robert Hall, in "any country or age." His celebrated treatise on the "Freedom of the Will," originally undertaken to furnish a philosophical basis for the theological system of Calvin, to which the author was firmly attached, ranks among the standard authorities in English metaphysics; and his "Dissertation on the Nature of True Virtue," his controversial work on "Original Sin," his "Treatise concerning Religious Affections," and other works, though now comparatively little read, on account of the prolixity of their style and the prevailing distaste for writings of a profoundly reflective character, exhibit a force of thought and keenness of argument only displayed by the greatest minds. Other theologians of the colonial period were a second Charles Chauncy (1705–'87); John Witherspoon (1722–'94); James Blair (died in 1743), president of William and Mary college; Jonathan Mayhew (1720–'66), a vigorous opponent of episcopacy and a man of liberal political views; Samuel Johnson (1696–1772), the first president of Columbia college, and the father of the American Episcopal church; Samuel Cooper (1725–'83); Mather Byles (1706–'88), a loyalist during the revolution, now chiefly remembered for his humor; and Ezra Stiles (1727–'95), president of Yale college. John Woolman (1720–'72), a Quaker writer and preacher, whose "Journal" is highly commended by Charles Lamb, deserves mention as one of the first who wrote against slavery. The influence of the great English essayists and novelists of the 18th century had meanwhile begun to affect the literature of the new world; and in the essays, the collection of maxims published under the title of "Poor Richard" or "The Way to Wealth," the scientific papers, and the autobiography of Benjamin Franklin (1706–'90), we have specimens of practical philosophy or of simple narrative, expressed in a style eminently clear, pleasing, and condensed, and not unfrequently embellished by the wit and elegance characteristic of the best writers of Queen Anne's time. His investigations in electricity and other scientific subjects are not less felicitously narrated, and, together with the works of James Logan (1674–1751), Paul Dudley (1675–1751), Cadwallader Colden (1688–1776), and John Bartram (1701–'77), a naturalist and one of the earliest of American travellers, constitute the chief contributions to scientific literature during the colonial period. The historians and annalists are less prominent than the theologians, and their writings if possible less known at the present day. The tracts and pamphlets relating to the discovery and colonization of British America, emanating from early settlers, are nevertheless exceedingly numerous; and the journals and annals of such men as Winthrop, Winslow, Morton, and others, though not strictly belonging to American literature, are worthy of note as the sources from which modern historical writers have derived much important information. William Hubbard (1621–1704) wrote the history of New England, which however was not published until more than a century after his death; and Thomas Prince (1687–1758), who devoted a great part of his life to collecting materials, commenced a more extensive work on the same subject, but which was never completed. Among the earlier contributions to American local history may be mentioned the history of Rhode Island by John Callender (1706–'48), that of the discovery and settlement of Virginia by William Stith (died in 1750), and that of Massachusetts by Thomas Hutchinson, its last colonial governor, a man of considerable learning and culture, but "blind except to facts, and without a glimpse of the great truths which were the mighty causes of the revolutions he describes." Of works relating to the Indians, the most noteworthy were the history of King Philip's war by the famous Captain Benjamin Church (1639–1718), the history of the Five Nations by Cadwallader Colden, and the "Diary" of the missionary David Brainerd (1718–'47). The poetry of this period has no pretension to literary merit, but the drama of "The Prince of Parthia," by Thomas Godfrey, a son of the inventor of the mariner's quadrant, deserves mention as the first work of the class produced in America.—II. 1775 to 1820. The earliest works produced during the first American period, commencing with the revolution, are naturally associated with the causes which led to that event; and the political pamphlets, speeches, letters, and other writings of the men who aided in securing the independence of the North American colonies afford the first indications of a desire to cast aside the conventionalisms of European literature, and to develop one characteristic of the country and its institutions. The severance of the intellectual reliance of the colonies upon the mother country followed as a consequence of their political independence, and as early as the commencement of the revolutionary struggle the high literary ability as well as the practical wisdom evinced in the public documents of the principal American statesmen were recognized by Lord Chatham, in whose opinion these productions rivalled the masterpieces of antiquity. Politics now gained a prominence almost equal to that enjoyed by theology in the preceding period; and dry as such subjects usually are to the mass of readers, the discussion of them in speeches and pamphlets during the last quarter of the 18th century accorded thoroughly with the popular taste, and the influence of political writers and orators in giving a decided national type to American literature is unmistakable. Conspicuous among the early pamphleteers were James Otis (1725–'83), Josiah Quincy, jr. (1744–'75), John Dickinson (1732–1808), Joseph Galloway (1730–1803), a tory writer, Richard Henry Lee (1732–'94), Arthur Lee (1740–'92), William Livingston (1723–'90), William Henry Drayton (1742–'99), John Adams (1735–1826), Thomas Jefferson (1743–1826), and Timothy Pickering (1745–1829), of whom Otis and Quincy were perhaps most distinguished as orators, although little beyond the traditions of their eloquence has come down to us. For fervid declamation Patrick Henry (1736–'99) stands at the head of all the orators of this period; and in the reports of his speeches, meagre as they are, he has been more fortunate than others of his contemporaries, as Samuel Adams (1722–1803), John Rutledge (1739–1800), Edward Rutledge (1749–1800), Charles Cotesworth Pinckney (1746–1825), Gouverneur Morris (1752–1816), and George Mason (1726–'92), whose reputation as parliamentary debaters or public speakers was very high, and whose impassioned eloquence is described as having "moved the hearers from their seats." These men may be considered the founders of the present school of American oratory. The "Common Sense" of Thomas Paine (1737–1809), though not strictly the work of an American author, may be classed among the early national literature, from the fact that it was thoroughly American in tone, and was inspired by the causes which produced the revolution. The great state paper of this era, and perhaps the most remarkable ever produced, was the "Declaration of Independence," by Thomas Jefferson, who desired that his title to the authorship might be engraved on his monument. For the concise and direct manner in which the grounds of complaint against the mother country are stated, for dignity and eloquence, and for the influence which it has exerted and the reverence with which it is still regarded, it may be considered unrivalled among works of its class. Jefferson also published a "Summary View of the Rights of British America," and a volume entitled "Notes on Virginia," which passed through many editions in Europe and America, and left a mass of correspondence forming a valuable contribution to American political history. The writings of George Washington (1732–'99), produced in great part amid the excitements and harassments of military life, must always hold a distinguished place in American literature, not only on account of the lofty patriotism by which they are inspired, and of their solid common sense, but of their clearness of expression and force of language—a characteristic, indeed, of most of the writers who were contemporary with him. Alexander Hamilton (1757–1804), by turns soldier, lawyer, and statesman, and eminent in each walk, was a member of the convention which framed the federal constitution; and according to Guizot there is not "one element of order, strength, or durability" in that instrument which he did not powerfully contribute to introduce. An enduring monument of his political sagacity and literary ability is the "Federalist," a series of papers written chiefly by himself for the purpose of elucidating and supporting the principles of the new constitution, and which is said by the "Edinburgh Review" to exhibit "an extent and precision of information, a profundity of research, and an acuteness of understanding, which would have done honor to the most illustrious statesmen of ancient or modern times." Hamilton was assisted in this work by John Jay (1745–1829), the first chief justice of the United States, and James Madison (1751-1836), the fourth president, of whom the former was the author of an "Address to the People of Great Britain" issued by congress in 1774, and other political papers, and the latter a prolific writer on political, constitutional, and historical subjects. John Adams, who wrote with eminent perspicuity and elegance, published a "Defence of the American Constitution," and a series of "Discourses on Davila," directed against the French revolutionary ideas prevalent in the last decade of the 18th century, of which Jefferson was one of the ablest advocates, and left numerous political papers and letters, which, together with his "Diary," commenced in 1755, have been edited by his grandson Charles Francis Adams. The most accomplished rhetorician and speaker of the period was Fisher Ames (1758–1808), whose essays and orations are distinguished by a splendor of diction which often wearies the mind, notwithstanding the felicity and appositeness of the metaphors and illustrations employed. His reputation, owing to the temporary interest of many of the subjects on which he wrote and spoke, has very considerably declined.—The historians and biographers of this period creditably illustrate the growing literature of the country, and several of their productions are still regarded as standard authorities. Among special local histories may be mentioned those of New Hampshire by Jeremy Belknap (1744–'98), whose series of "American Biographical Sketches" were the precursors of the valuable works of Sparks; of Connecticut by Benjamin Trumbull (1735–1820); of Massachusetts by George R. Minot (1758–1802), being a continuation of that by Hutchinson; of Vermont by Samuel Williams (1761–1818); and of Pennsylvania by Robert Proud (1728–1813). Of more general interest are the histories of New England by Hannah Adams (1756–1832) and of the American revolution by William Gordon (1730–1807), an English clergyman long settled in America, and David Ramsay (1749–1815), who also wrote a history of South Carolina, a life of Washington, and other works, evincing much research and a conscientious spirit of inquiry. The "Annals of America," by Abiel Holmes (1763–1837), has for more than half a century been considered a leading authority in American history. The most important biography produced during this period is the "Life of Washington" by Chief Justice Marshall (1755–1835), whose literary labors however are overshadowed in importance by his judicial celebrity. William Wirt (1772–1834), an accomplished forensic orator, produced an admirable "Life of Patrick Henry," and also a series of papers entitled "Letters of the British Spy," written with much elegance and force of style; and the "Military Journal" of James Thacher (1754–1844), and "Memoirs" of Alexander Graydon (1752–1818), both officers in the American revolutionary army, contain many interesting and trustworthy accounts of the men and times which they illustrate. The "Letters from an American Farmer," by Hector St. John Crevecœur (1731–1813), also afford pleasing pictures of social life in America. Of works of travel, the most important are the narrative of Jonathan Carver (1732–'80), one of the first who penetrated west of the Mississippi valley; the journals of the intrepid John Ledyard (1751–'89); the reports of Major Zebulon Montgomery Pike (1779–1813), the earliest American explorer of the sources of the Mississippi and the Rio Grande; and the account of the expedition of Lewis and Clark across the Rocky mountains to the mouth of the Columbia river, prepared by Nicholas Biddle and Paul Allen.—The theologians of this period are ably represented by Jonathan Edwards (1745–1801), son of the great metaphysician of the same name, and the author of a profound "Dissertation on Liberty and Necessity," and of a treatise entitled "The Salvation of all Men Examined and Explained;" Samuel Hopkins (1721–1803), whose "System of Theology" presents a reflex of the progress of religious opinions in New England; Timothy Dwight (1752–1817), president of Yale college, whose principal work, "Theology Explained and Defended," maintains moderate Calvinistic views with much dignity and eloquence, and has been extensively circulated in England and America; and Bishop William White (1747–1836), the earliest historian of the Protestant Episcopal church in America. Other eminent divines and authors were Joseph Bellamy (1719–'90), John Smalley (1734–1820), Nathaniel Emmons (1745–1840), John Mitchell Mason (1770–1829), Noah Worcester (1758–1838), Samuel Worcester (1771–1821), Edward Payson (1783–1827), Bishops John Henry Hobart (1775–1830) and Theodore Dehon (1776–1817), and John Murray (1741–1815), the father of Universalism in America. Prominent among the younger divines was Joseph Stevens Buckminster (1784–1812), one of the earliest of the New England Unitarians, and whose published sermons, remarkable for purity of thought and finish of style, justify the expectations which his untimely death dispelled. At this period, in addition to purely theological subjects, the clergy were in the habit of discussing those of public interest; whence it frequently happened that discourses from the pulpit had almost as decided a political bias as the set speeches of the party orators—a practice which the subsequent wide diffusion of newspapers tended to check.—One of the first and most useful laborers in the field of science was David Rittenhouse (1732–'96), a great and self-educated genius, whose memoirs on astronomy and mathematics were published in the first 4 volumes of the "Transactions" of the philosophical society of Philadelphia. Benjamin Rush (1745–1813) and James McClurg (1747–1825) were conspicuous as writers on medical science, the work of the former on the "Diseases of the Mind" being still a standard authority; and Benjamin Smith Barton (1766–1815), a naturalist, produced the first American elementary work on botany, and the first contribution to the ethnographical literature of the country. The most important contribution to natural history was Alexander Wilson's "Description of the Birds of North America," a work still held in much repute. Samuel Latham Mitchill (1764–1831) was one of the earliest writers on chemistry. To these names may be added those of Lindley Murray (1745–1826), author of the treatise entitled the "Power of Religion over the Mind," and of the well known "English Grammar" bearing his name, and the eminent physicist Benjamin Thompson, Count Rumford (1753–1814), both of whom were by birth and education Americans.—The most distinguished poet of this period, whether we consider the variety and literary merit of his compositions or their popularity, was Philip Freneau (1752–1832), many of whose productions, inspired by the revolutionary spirit, display vigor of language and considerable imaginative power. Some of his smaller pieces preserve their popularity to the present day, and such writers as Campbell have not scrupled to borrow whole passages from them. Contemporary with him were John Trumbull (1750–1831), author of a once popular poem in the Hudibrastic style entitled "McFingal," in which the tories and other enemies to American liberty are satirized, and which presents a remarkably vivid picture of contemporary manners and opinions; Joel Barlow (1755–1812), who wrote a heavy epic entitled the "Columbiad," which was originally well received, and reprinted in London and Paris, and a humorous mock-heroic poem in praise of "Hasty Pudding;" Lemuel Hopkins (1750–1801), author of a satirical poem called the "Anarchiad;" and Timothy Dwight, the theologian, whose "Conquest of Canaan," an epic, and other poems, are smoothly versified, and exercised a considerable influence upon contemporary writers. William Clifton (1772–'99) wrote a few songs equal to any poetry which had previously appeared in America; and Thomas Green Fessenden (1771–1837) produced in London a very successful satire on the physicians who opposed the metallic tractors of Perkins, entitled "The Terrible Tractoration." Among the other poets of the period were David Humphreys (1753–1818), Joseph Hopkinson (1770–1842), author of the well known national lyric "Hail Columbia," and Robert Treat Paine, jr. (1773–1811), whose "Adams and Liberty" was once a rallying song of the federalists. The style adopted by these writers was essentially that prevalent in England during the latter half of the 18th century; nor was any innovation upon established models, whether in form or expression, attempted in American poetry until after the commencement of the third and last period of the national literature.—Charles Brockden Brown (1771–1810), the first American novelist, was also the first author who made a profession of literature; and his best productions, "Wieland, or the Transformation," "Arthur Mervyn," and "Edgar Huntley," have much graphic power and are good specimens of the Godwin school of fiction. He was a man of feeble physical constitution, a rapid and often careless writer, and has been described as "a gentle, unobtrusive enthusiast, whose weak frame was shattered and wrecked by the too powerful pulsations of his heart."—Of the miscellaneous writers of the period, whose productions appeared mostly in the newspapers and magazines, the chief were Francis Hopkinson (1737–'91), eminent as a humorous writer in prose and verse; Hugh Henry Brackenridge (1748–1816), author of a vigorous satire entitled "Modern Chivalry;" Joseph Dennie (1768–1812), one of the earliest American magazine writers and editors, who published a well known series of essays under the title of "The Lay Preacher;" David Everett (1769–1813), Isaac Story (1774–1803), Royall Tyler (1756–1826), and Paul Allen (1775–1826).—III. 1820 to 1862. The last period in American literature presents a marked contrast to those which preceded in the national character, as well as in the variety and extent of its productions. It was in 1820 that the poverty of American literature was sneeringly commented upon by Sydney Smith in an article in the "Edinburgh Review;" and from that date the intellectual development of the country, the political crisis which attended the establishment of the government being past, has been commensurate with its social and material progress, until at the present day there may be said to be no department of human knowledge which has not been more or less thoroughly explored by American authors. In history, in jurisprudence, and in certain departments of natural science and imaginative literature, their efforts during the last 40 years have been exceeded by those of no contemporary authors in any part of the world. In the two former periods Europe, and particularly the mother country, was recognized as the chief source of mental supplies; a circumstance to be attributed in part to the obstacles to literary culture which a colonial condition necessarily imposes, in part to the facility with which the abundant literature of the old world may be appropriated by the new, and very considerably also to a want of self-reliance in native authors, and an indifference to the value of native material; but so rapid has been the intellectual development of the nation since that time, that America is now able to reciprocate in kind the benefits she so long exclusively enjoyed. It may be also generally remarked, that within this period the style and tone of the national literature have begun to partake more decidedly of the national character, although in certain departments only, particularly in that of imaginative writing, has any decided originality been shown. How far this originality has approximated to a permanent form it is not now possible to determine, but of its existence and rapid growth there can be no question.—While in the periods already treated of, the labors of American historians were for the most part confined to the collection of materials or to the unadorned record of facts, their successors have taken a wider range of subjects, and infused a more philosophical spirit into their writings; and although, among the many hundred historical works already produced, few rise above the dignity of local narratives or compilations of materials, as storehouses of data they have been ably employed by those who can analyze the significance of past events, and connect them by analogy with the tendency of the present. Prominent among these is George Bancroft, whose "History of the United States," a work still in progress, has been pronounced "the most successful attempt yet made to reduce the chaotic but rich materials of American history to order, beauty, and moral significance." It is characterized by an earnest sympathy with democratic institutions, by a generous enthusiasm for the martyrs of freedom and civilization, by patient research and discrimination in the choice of authorities, and by a style animated and genial throughout, although in occasional passages, perhaps, a little too labored. As the most complete and philosophic history of America yet written, it is destined to occupy an important place in the literature of the 19th century. The same subject has been ably treated by Richard Hildreth, whose work, bringing the narrative down to the year 1821, though written with no special attempt at rhetorical grace or picturesque effect, is valuable for its impartiality and general accuracy, and has become a standard book of reference. Many school histories of the United States have been written, of which those by Salma Hale, S. G. Goodrich ("Peter Parley," 1793–1860), Samuel Eliot, Emma Willard, B. J. Lossing, Marcius Willson, and G. P. Quackenbos may be cited. Intermediate between the latter and the larger histories is the compendious work of J. H. Patton, bringing the narrative down to a very recent date. Among works illustrating particular periods or passages in the general history of the country may be mentioned the "Pictorial Field Book of the Revolution," by Benson J. Lossing, an industrious and careful writer; the "History of the United States Navy," by James Fenimore Cooper; histories of the war of 1812 by C. J. Ingersoll (1782–1862) and Lossing; the "American Archives" and other works by Peter Force; and numerous minor productions by W. L. Stone (1792–1844), John Armstrong, W. H. Trescot, Brantz Mayer, Winthrop Sargent, Richard Frothingham, jr., J. T. Headley, J. Sprague, Frank Moore, and others. The list of local histories, whether of single states or groups of states, or of special territorial districts, or of institutions, presents many works of merit. At the head of these perhaps stands the "History of New England" by J. G. Palfrey (born 1796), of which two volumes, embracing the events previous to 1667, have been published. The subject is treated with more fulness than in the work of Bancroft, and in a style of singular purity and finish. To this class belong the valuable "Geography and History of the Mississippi Valley" by Timothy Flint (1780–1840), the "History of the Discovery and Exploration of the Mississippi" and other works by John Gilmary Shea, the history of New England by C. W. Elliott, those of the "New Netherlands" by E. B. O'Callaghan, of New York by John Romeyn Brodhead, of Connecticut by Theodore Dwight and by G. H. Hollister, of North Carolina by F. L. Hawks, of Kentucky by Mann Butler, of Louisiana by Charles Gayarré and by F. X. Martin, of Oregon and the north-west coast of North America by Robert Greenhow, of South Carolina by W. G. Simms, of Texas by H. Yoakum, of Rhode Island by S. G. Arnold, of Virginia by Charles Campbell, and of Western Massachusetts by J. G. Holland. Of the numerous minor works of this class, the elaborate history of Boston by S. G. Drake, and of Westchester county, N. Y., by Robert Bolton, and that of Harvard university by Josiah Quincy, may be cited as examples. The history of the aboriginal tribes has been ably treated by S. G. Drake, whose "Book of the Indians of North America," though written in an unambitious style, was the first attempt at an impartial narrative of the subject, and is a valuable repertory of facts; by T. L. McKenney and James Hall, who published a costly illustrated "History of the Indian Tribes of North America;" by George Catlin; by W. L. Stone; and especially by Henry Rowe Schoolcraft, whose works, although they come perhaps more naturally within the departments of travels and ethnography, evince a more intimate acquaintance with the history, languages, and customs of the North American aborigines than any others yet published. Of his elaborate "Historical and Statistical Information respecting the History, Condition, and Prospects of the Indian Tribes of the United States," the most considerable work of the class yet undertaken, 6 vols. 4to. have appeared. The "History of the Conspiracy of Pontiac," by Francis Parkman, narrates in an animated style an interesting episode in colonial history, and is one of the most valuable recent contributions to the history of the North American Indians. The works relating directly or indirectly to the history of the United States include C. W. Upham's account of the Salem witchcraft in 1692, R. S. Ripley's "War with Mexico," E. D. Mansfield's "Mexican War," G. W. Kendall's "Santa Fé Expedition," and Theodore Irving's "Conquest of Florida." Among American authors whose labors have been prosecuted beyond the limits of local or domestic history, no name stands higher than that of William Hickling Prescott (1796–1859), the historian of the Spanish conquest and civilization in the new world, and one of the most graceful and natural writers of the English language. His histories of the reigns of Ferdinand and Isabella and Philip II. of Spain, and of the "Conquest of Mexico" and the "Conquest of Peru," and his continuation of Robertson's "History of Charles V.," though produced under serious disabilities, the chief of which was an almost total blindness, exhibit an astonishing depth and accuracy of research, and, as one of the most eminent of his contemporaries has observed, "an impartiality and soundness of judgment, which give authority to every statement, and weight to every conclusion." The style is at the same time so lucid and attractive, as frequently to invest the narrative with the charm of fiction—a circumstance which has greatly contributed to render Prescott in both hemispheres one of the most popular of modern historians. As Prescott was the first to treat adequately the brilliant period of Spanish ascendency, so the revolt of the Spanish provinces of the Netherlands has afforded a congenial subject to John Lothrop Motley (born 1814), whose "Rise of the Dutch Republic" and "History of the United Netherlands," the latter a continuation of the former, display extensive research, and are written with animation, and occasionally with great picturesque beauty of style. The author's instincts are strongly enlisted on the side of political and religious freedom, but without detracting from the impartiality of the narrative, and the work has taken its place among the great histories of the time, and been translated into the principal languages of Europe. Among other writers of foreign history may be mentioned Henry Wheaton, author of a "History of the Northmen;" Archibald Alexander, author of a "History of the Colonization of the West Coast of Africa;" Brantz Mayer, J. R. Poinsett, and R. A. Wilson, who have written on Mexico; Parke Godwin, who has published the first volume of an elaborate "History of France;" D.O. Allen, A.L. Koeppen, J. J. Jarves, Edmund Flagg, W. H. Stiles, and G. W. Greene. Many excellent works in the department of ecclesiastical or religious history have also been produced, prominent among which are the "Annals of the American Pulpit," by W. B. Sprague; the "History of the Presbyterian Church," by Charles Hodge; the "History of the Apostolic Church," by Philip Schaff; the "Progress of Religious Ideas," by Mrs. Lydia Maria Child; the "History of Methodism," by Abel Stevens; the "Modern History of Universalism," by Thomas Whittemore; the "Post-Biblical History of the Jews," by M. J. Raphall; the "Ecclesiastical History of New England," by J. B. Felt; the contributions to the history of the Protestant Episcopal church in Virginia, by Bishop William Meade and F. L. Hawks; the "History of the Baptist Denomination," by D. Benedict; the history of the "English Bible," by Mrs. H. C. Conant; and various works by Archibald Alexander, James Murdock, S. F. Jarvis, Robert Baird, Thomas Gaillard, W. Ingraham Kip, John Dowling, J. A. Spencer, and many others. To the department of literary history, the most important contributions are the "History of Spanish Literature," by George Ticknor, which is universally esteemed the best work on the subject extant; the several works of R. W. Griswold on the "Prose Writers," the "Poets," and the "Female Poets" of America; Caroline May's "American Female Poets;" J. S. Hart's "Female Poets of America;" C. D. Cleveland's compendiums of English, American, and classical literature; W. T. Coggeshall's "Poets and Poetry of the West;" T. Buchanan Read's "Female Poets of America;" and Mrs. A. C. L. Botta's "Handbook of Universal Literature." The "Cyclopædia of American Literature," by E. A. and G. L. Duyckinck, is the only comprehensive work on the subject yet published; and the "Critical Dictionary of English Literature," by S. Austin Allibone, of which the first volume has appeared, will form a valuable epitome of the literary history of England and the United States. Among miscellaneous works, the most important is the "History of Liberty," by Samuel Eliot, the completed portion of which, covering the history of the ancient Romans and the early Christians, and the struggle for constitutional liberty in Spain in the 16th century, is written with ability and in a philosophic spirit. —The first in point of date and reputation among the writers of biography of this period is Washington Irving (1783–1859), whose narratives of the "Life and Voyages of Christopher Columbus," and of the "Voyages and Discoveries of the Companions of Columbus," though not the most characteristic of his writings, constitute a permanent contribution to English and American literature. Of more immediate and general interest is his "Life of George Washington," completed a few months before the author's death, and which perhaps has been more generally read in America than any other of his works. The narrative, embracing necessarily the main incidents of the revolutionary struggle, is related with such vivacity and picturesque beauty of language, that it is difficult to conceive how it can ever be superseded in popular use. His lives of Mahomet and Goldsmith are pleasing compilations, having little claim to originality. Among the most industrious laborers in the field of American biography is Jared Sparks (born 1789), who has devoted the greater part of his life to studies illustrative of the history of his country, and whose works, written in a sober and correct style, display remarkable fidelity and diligence of research. The "Library of American Biography," in two series and 25 volumes, edited by him, and to which he contributed lives of John Ledyard, Benedict Arnold, Ethan Allen, Charles Lee, Father Marquette, and others, is enriched by contributions from some of the best writers in the country, and is highly creditable to the national literature. Mr. Sparks has also edited the writings of Washington and Franklin, with lives of each, the diplomatic correspondence of the revolution, and the correspondence of public men with Washington—the whole constituting a rich fund of national material. Of the many biographies of public men produced during this period, the most prominent are those of Josiah Quincy, jr., by his son Josiah Quincy, of Elbridge Gerry by J. T. Austin, of James Otis by William Tudor, of Joseph Reed by his grandson W. B. Reed, of William Wirt by John P. Kennedy, of Thomas Jefferson by George Tucker and by H. S. Randall, of John Adams by his grandson Charles Francis Adams, of Joseph Story by his son W. W. Story, of Alexander Hamilton by his son J. C. Hamilton, of Henry Clay by Calvin Colton, and of Aaron Burr and Andrew Jackson by James Parton, some of which have obtained a wide popularity. Among special biographies of American subjects may be mentioned the "Life of William Ellery Channing," by his nephew William Henry Channing; the "Memoirs of Margaret Fuller Ossoli," by W. H. Channing, Ralph Waldo Emerson, and James Freeman Clarke; the "Life of Daniel Boone," by Timothy Flint; a "Life of Washington," by Mrs. C. M. Kirkland; lives of Marion, Greene, and Captain John Smith, by W. G. Simms; the lives of the Indian chiefs Joseph Brant and Red Jacket, by W. L. Stone; the life of Bishop A. W. Griswold, by J. S. Stone; "Memoir of Rev. Dr. Buckminster and Joseph Stevens Buckminster," by Mrs. Eliza Buckminster Lee; the "Life of Theophilus Parsons," by his son Theophilus Parsons; "Memoirs of Nathaniel Emmons," by E. A. Park; the "Life of Washington Irving," by his nephew Pierre M. Irving, of which the first two volumes have appeared; beside many biographical sketches by Alexander Slidell Mackenzie, G. E. Ellis, Edward and Alexander H. Everett, H. A. Garland, C. C. Felton, C. W. Upham, Henry Wheaton, W. H. Prescott, Henry Reed, G. S. Hillard, W. Gammell, J. T. Headley, John Sanderson, R. T. Conrad, C. A. Goodrich, M. L. Davis, Alden Bradford, S. L. Knapp, N. Biddle, Epes Sargent, B. J. Lossing, G. L. Duyckinck, George H. Moore, Mrs. E. T. Ellet, and others. To this class also belong such works as the "Lives of American Loyalists," by Lorenzo Sabine, the "Personal Memoirs" of Joseph T. Buckingham, the "Reminiscences" of Bishop Philander Chase, and the "Ten Years of Preacher Life" and other works of William Henry Milburn. The contributors to miscellaneous and foreign biography comprise J. S. C. Abbott, author of a "Life of Napoleon," conceived in an unusually intense admiration of his subject, R. W. Griswold, H. W. Herbert, Samuel Osgood, J. Milton Mackie, Hannah F. Lee, X. Donald McLeod, Alfred Lee, Richard Hildreth, F. L. Hawks, Bishop J. R. Bayley, R. H. Wilde, and many others. Female biography has been comprehensively related by Mrs. S. J. Hale in her "Woman's Record," a sketch of distinguished women in all times. The principal general biographical dictionaries are those of William Allen, devoted to American subjects, and J. L. Blake; beside which a "Dictionary of Painters, Sculptors, and Engravers" has been published by S. Spooner, and a "Cyclopædia of Music" by J. W. Moore.—Washington Irving, though not exclusively a writer of prose fiction, was the first American whose fame in this department extended beyond the limits of his native country; and his "Sketch Book," "Knickerbocker's History of New York," "Bracebridge Hall," and "Tales of a Traveller," first introduced to a European public between 1820 and 1830, attracted immediate attention by their imaginative power, by their fine pathos and humor, and by the singularly pure and graceful style in which they were expressed. Though in many respects they might be taken for the productions of an author trained among the influences of an older civilization and accustomed to its literary amenities, the stories founded upon American subjects, of which the "Legend of Sleepy Hollow" may be cited as an example, are too national in feeling and in local character and color to admit of a doubt as to their origin, and will always constitute a delightful and indispensable part of American literature. James Fenimore Cooper (1789–1851) has the credit of giving the first decided impulse to romantic fiction in the new world, and through his works American literature became first generally known abroad. His "Spy," his nautical tales, including "The Pilot" and "The Red Rover," which, according to the "Edinburgh Review," gave him "the empire of the sea," and above all his series of Indian stories, abounding in lively pictures of forest life, by their freshness, power, and novelty, took a strong hold upon the popular mind in both hemispheres; and some of them, including "The Spy" and "The Last of the Mohicans," have probably been translated into more languages than any other works of fiction. As a novelist, he was deficient in some of the chief requisites of his calling; but his faculty of description, and quick appreciation of what was tangible and characteristic in his native land, enabled him to obtain a success unsurpassed perhaps by any contemporary novelist, and which has been described as "a rich and legitimate fruit of American genius." The success of Cooper gave to the novel of adventure and backwoods life, or that founded upon colonial and revolutionary incidents, a popularity which caused it for a long time to be the chief form of fiction cultivated; and among many meritorious works of this class may be mentioned "The Dutchman's Fireside" and "Westward Ho" of James Kirke Paulding (1779–1860), a vigorous and successful writer; "Rob of the Bowl," "Swallow Barn," and "Horse Shoe Robinson," by James Pendleton Kennedy (born 1795); "Redwood," "Hope Leslie," "The Linwoods," and other pleasing pictures of early American life, by Miss C. M. Sedgwick; "The Partisan," "Mellichampe," "The Yemassee," "Guy Rivers," and numerous other tales by W. G. Simms (born 1806), one of the most dramatic and prolific of American authors, and who has drawn largely from the legendary history of the southern states for his materials; "Hobomok" and "The Rebels," by Mrs. L. M. Child (born 1802); "Seventy-Six" and other works by John Neal; "A New Home," by Mrs. C. M. Kirkland; the border tales of Dr. Robert Bird (1803–'54); and works by Timothy Flint (1780–1840), James Hall (born 1793), C. F. Hoffman (born 1806), T. B. Thorpe, C. W. Webber, and others. For finish of style, delicacy of psychological insight, and power in delineating the darker features of life and the emotions of guilt and pain, Nathaniel Hawthorne (born 1804) holds a peculiar place among American novelists. Writing on national subjects, and delighting especially in the gloomy passages of New England colonial history, he has employed fiction less for the purpose of illustrating practical life or of adding to the creations of the imaginative world, than of solving psychological problems. His "Scarlet Letter" and "House of the Seven Gables" were preceded by a variety of fancy sketches and historical narratives, published under the titles of "Twice-Told Tales" and "Mosses from an Old Manse," which in point of style and subtle analysis of character are among the most exquisite of the minor productions of American literature. The "Blithedale Romance," the next in the order of his novels, is marked by similar characteristics; and the "Marble Faun," the most elaborate and powerfully drawn of all his works, contains in addition pictures of Italian life and scenery of unsurpassed beauty. The "Tales of the Grotesque and Arabesque," and other fictions, by Edgar Allan Poe (1811–'49), exhibit extraordinary metaphysical acuteness and a wild and gloomy imagination; but his analytical power, unlike that of Hawthorne, is seldom pervaded by any moral sentiment, and his finest creations, though they are elaborated with skill, have little human interest. N. P. Willis (born 1807) has obtained a unique reputation as a delineator of the lights and shadows which flit over the surface of society, and his style, remarkable for its felicity, not to say happy audacity of expression, is in accord with his subjects. His prose writings, though including many tales, belong perhaps more properly to the departments of travels and belles-lettres. As pictures of domestic life among the ancients, the "Zenobia," "Probus," and "Julian" of William Ware (1797–1852) are not surpassed by any similar productions in English literature. To this class also belong "Philothea," a tale of Athens in the days of Pericles, by Mrs. Child, and "The Roman Traitor," by Henry William Herbert (1807–'58), a successful contributor to many departments of literature, and well known under the pseudonyme of "Frank Forester." For invention and graphic power Herman Melville's tales of ocean adventure, including "Typee" and "Omoo," stand perhaps at the head of their class in American literature, and have been widely read and admired abroad. The "Berber" and "Kaloolah" of W. S. Mayo, and the lively sketches of Lieut. H. A. Wise (Harry Gringo), are successful attempts in the same field. The most popular novel of the present century was the "Uncle Tom's Cabin" of Mrs. Harriet Beecher Stowe, an anti-slavery fiction, which has circulated by millions of copies in many languages, and deeply moved the public heart in Europe and America, not more on account of the moral of the story than of its pathos, its dramatic fervor, its delightful humor, and its inimitable pictures of negro life. "Dred," her second anti-slavery romance, is perhaps a work of more power than its predecessor, although less popular; and among her subsequent productions are the "Minister's Wooing," remarkable for its pictures of social and religious life in New England during the last century, the "Pearl of Orr's Island," and "Agnes of Sorrento." Of other novels founded upon the slavery question, the "White Slave," by Richard Hildreth, and "Ida May," by Mary Langdon (Mrs. Pike), may be cited as examples; and the "Partisan Leader," by Beverly Tucker, published originally many years ago, has recently attracted attention from its political significance, in connection with the war against the federal union. Of prose fictions by authors who have won distinction principally in other walks of literature, the most deserving of notice are "Monaldi," by Washington Allston (1779–1843); "Paul Felton" and other tales published by R. H. Dana (born 1787) in the "Idle Man," a serial edited by himself; "Hyperion," a series of charming pictures of scenery and manners in Europe, connected by a thread of story, and "Kavanagh," by H. W. Longfellow (born 1807); "Leaves from Margaret Smith's Journal," by J. G. Whittier (born 1808), and "Elsie Venner," by Oliver Wendell Holmes (born 1809). The humorous writers are represented by Seba Smith, author of the well known letters of "Major Jack Downing," Cornelius Mathews, J. C. Neal (1807–'48), R. C. Sands (1799–1832), W. G. Clark (1810–'41), G. H. Derby, F. S. Cozzens, G. D. Prentice, and C. F. Briggs; beside Irving, whose "Knickerbocker's History of New York" is perhaps the most elaborate piece of humor in the national literature; Paulding, who in conjunction with Irving produced the "Salmagundi;" and some others mentioned above. Holmes possesses a copious vein of original humor, which however appears to the best advantage in his poems and miscellaneous prose writings. The list of American humorous writings would be incomplete without an allusion to that class of grotesque tales of which the "Big Bear of Arkansas" and the "Quarter Race in Kentucky," by T. B. Thorpe, afford characteristic specimens. Among other writers of prose fiction may be enumerated Sylvester Judd (1813–'53), author of "Margaret," a tragic tale of New England life, and "Richard Edney;" T. S. Fay, G. P. Thompson, Brantz Mayer, T. S. Arthur, J. V. Huntington, J. T. Trowbridge, L. M. Sargent, F. W. Shelton, George Wood, J. H. Ingraham, P. P. Cooke, J. E. Cooke, J. G. Holland, R. B. Kimball, C. G. Leland, X. Donald McLeod, G. W. Curtis, A. S. Roe, H. P. Myers, J. B. Cobb, and Robert T. S. Lowell. The female writers of fiction of this period constitute a numerous and important body, and the works of some of them are not exceeded in popularity by any contemporary writings of their class. It will suffice to mention, in addition to works already referred to, the several series of "Pencil Sketches," by Miss Eliza Leslie (1787–1857); the "Three Experiments of Living," by Mrs. H. F. Lee; "The Wide, Wide World" and "Queechy," by Miss Susan Warner; "Ruth Hall," "Fern Leaves," and other popular productions, by Mrs. S. P. W. Parton (Fanny Fern); "The Household of Bouverie," by Mrs. C. A. Warfield; "Naomi," by Mrs. E. B. Lee; "Charms and Counter-Charms," by Miss M. J. Mackintosh; beside numerous volumes by Mrs. Hale, Mrs. E. C. Embury, Mrs. C. L. Hentz, Mrs. A. S. Stephens, Mrs. E. Oakes Smith, Mrs. Ellet, Mrs. A. C. (Mowatt) Ritchie, Mrs. E. D. E. N. Southworth, Miss A. B. Warner, Mrs. E. S. Phelps (Trusta), Mrs. Alice Bradley (Neal) Haven, Miss Alice Carey, Miss Caroline Chesebro, Mrs. E. Robinson (Talvi), Miss Maria Cumming, Miss H. E. Prescott, Mrs. Virginia Terhune (Marion Harlan), Miss A. J. Evans, Mrs. M. J. Holmes, Mrs. M. H. Eastman, Mrs. Elizabeth Stoddard, Mrs. M. A. Sadlier, Mrs. M. A. Denison, Mrs. M. C. Lawrence, Mrs. M. E. Hewitt (Stebbings), and many others.—In intimate connection with the departments already treated is that of juvenile literature, to which several authors have exclusively devoted themselves, and among the contributors to which are many of those previously mentioned. The first place undoubtedly belongs to S. G. Goodrich, whose numerous little books for the instruction or edification of children, published under the pseudonyme of "Peter Parley," have had a prodigious circulation in Europe as well as America. Nathaniel Hawthorne has written some delightful tales for children; Jacob Abbott (born 1803) is the author of the popular "Rollo," "Lucy," "Franconia," and other series of stories, and of numerous juvenile histories; and W. M. Simonds, John Bonner, F. C. Woodworth, George Taylor, Charles Nordhoff, Mrs. E. C. Judson (Fanny Forester, 1817–'54), Mrs. S. J. Lippincott (Grace Greenwood), Mrs. L. H. Sigourney, Miss C. M. Sedgwick, Miss McIntosh, Mrs. L. C. Tuthill, Mrs. Parton (Fanny Fern), Mrs. L. M. Child, Mrs. A. B. (Neal) Haven, Mrs. H. C. Knight, Mrs. A. A. Carter, Mrs. H. S. Phelps, Mrs. Hubbell, and many others have devoted a large portion of their time to this species of literature.—The poetry of this period, in view of the absorbing industrial life of the people, has shown a remarkably healthy and abundant development; and it is probable that the number of writers is more numerous here than in any other country. Notwithstanding also the limited range of native subjects, which makes the imaginative literature of the country in some respects an imitation or rather a continuation of that of other lands, the grand features of national scenery, legend, and history have not failed of capable illustrators, while the familiar imagery of an older civilization has been often reproduced with force and originality. Among those who have made a felicitous use of native materials, one of the most eminent and thoroughly American is William Cullen Bryant (born 1794), whose poems, the fruits of meditation rather than of passion or imagination, are remarkable for their descriptive powers, their serene and elevated philosophy, and noble simplicity of language. His "Thanatopsis" is in a high strain of contemplative poetry, and the peculiar aspects of nature in the western world have suggested many of his most characteristic minor pieces. Richard H. Dana (born 1787) was one of the first in America to break away from the school of Pope, and his "Buccaneer," a narrative of crime and retribution, had no slight influence in directing the poetical taste of the country. He has been called "the most psychological of American poets," and the solemnity of tone which pervades his works indicates an imagination deeply moved by the tragic and remorseful elements in humanity. Charles Sprague (born 1791) is the author of an "Ode to Shakespeare," a metrical essay on "Curiosity," and a few other pieces; J. G. Percival (1795–1857) possessed a remarkable command of language and metre, and his "Coral Grove" and "New England" are established favorites; the few poetical remains of Washington Allston (1779–1843), including the "Sylphs of the Seasons," evince an exuberant fancy and much metrical skill; and Joseph Rodman Drake (1795–1820) produced the "Culprit Fay," an imaginative poem, exquisitely versified, although the taste of the poet in transporting the fairy mythology of the old world into the primeval solitudes of the new is questionable. Of all American poets who have written so little, the most popular perhaps is Fitz-Greene Halleck (born 1795), whose "Marco Bozzaris" and lines on Robert Burns are fine specimens of the martial lyric and the elegiac poem, as well as of that union of sound with sense which in the estimation of many constitutes the true theory of versification. His longest poem, "Fanny," is pervaded by a light vein of irony, sometimes incongruously introduced into his pieces devoted to serious subjects. The Scripture pieces of N. P. Willis are written with feeling and artistic finish; in his other poems the verbal felicity and sprightly fancy characteristic of his prose writings are discernible. The few brief poems of Ralph Waldo Emerson (born 1803), of which "The Problem" and the lines "To a Humble Bee" afford examples, are remarkable for their quaint imagery and originality of thought. The early song writers of the period are represented by G. P. Morris (born 1802), the most popular of his class in America, and Edward Coates Pinkney (1802–'28) and C. F. Hoffman, whose amatory or convivial verses are gracefully written and well adapted to music. Among other early writers of the period who are remembered for one or more successful poems, are F. S. Key (1779–1843), author of the "Star-Spangled Banner;" R. H. Wilde (1789-1847), of the song commencing "My Life is like the Summer Rose;" and John Howard Payne (1792–1852), whose "Home, Sweet Home" is known wherever the English language is spoken. The poems of E. A. Poe form a fitting accompaniment to his prose writings, and are characterized by a shadowy and gloomy imagination, and a fascinating melody of rhythm. His longest poem, "The Raven," illustrates his facility in harmonizing sentiment with rhythmical expression; and his "Annabel Lee," "Haunted Palace," and "Bells" are constructed with equal skill. The most artistic and cosmopolitan of American poets, and the most widely read abroad, is H. W. Longfellow, whose genius has been powerfully influenced by the literature and historic associations of the old world, while in the choice and treatment of his principal subjects he is eminently American. His minor poems are chiefly meditative, and the harmony of the numbers, the verbal felicity, and the novelty and appositeness of the imagery give life and freshness to the rather trite maxims which they embody. His "Psalm of Life," "Footsteps of Angels," "Light of Stars," "Village Blacksmith," and "St. Augustine's Ladder," familiar specimens of this class, have been aptly described as "gems set with consummate taste." His "Skeleton in Armor" has much of the spirit of the old Scandinavian legend; and in "Evangeline" and "The Song of Hiawatha" (the latter, in theme, sentiment, and treatment, the most thoroughly aboriginal poem yet written), he has made the first successful attempt on a considerable scale to naturalize the hexameter and trochaic measures in English literature. Much of the poetry of J. G. Whittier has been prompted by his opposition to slavery, and in occasional pieces he rises to a strain of genuine lyrical exaltation. Of this character are his "Massachusetts to Virginia" and "Astræa at the Capitol." In other poems he unites tenderness and grace with much simplicity of language. James Russell Lowell (born 1819) is one of the most versatile of the younger poets of this period, and his serious writings are earnest and philanthrophic in tone, elevated in sentiment, and of high artistic merit in the construction. He is perhaps the ablest of American satirists, and has gained a unique reputation as a humorist by his "Biglow Papers," in which the peculiar phraseology of New England is given with great verbal and idiomatic correctness. The prose introductions to these poems have a subtle humor which can be best appreciated by those familiar with the local peculiarities they illustrate. Not less conspicuous as a humorist is O. W. Holmes, the most effective writer of the school of Pope, and distinguished by a clear, concise, and manly style. For the mingled pungency and geniality of his humor he is unrivalled among American poets; and his "Old Ironsides" and "La Grisette" show him capable of high lyric flights as well as of pathetic expression. In his knowledge of local dialects and idioms he is not inferior to Lowell. J. G. Saxe (born 1816) is known chiefly as a humorous poet, and his verses enjoy a considerable popularity. A. B. Street (born 1811) has devoted himself more than any other native poet to the romantic aspects of American scenery and forest life, and his works contain many striking and picturesque descriptive passages. Among other poets and occasional writers of verses of this period, all of whom have produced some pieces of high merit, may be mentioned John Pierpont (born 1785), John Neal, J. G. Brainard, Andrews Norton (1786–1853), Henry Ware, jr. (1794–1843), I. Clason, W. G. Simms, R. C. Sands, G. W. Doane, A. G. Greene, Rufus Dawes, Sumner Lincoln Fairfield, James Aldrich, George Lunt, G. W. Bethune, G. D. Prentice, Grenville Mellen, William Croswell, Thomas Ward, W. D. Gallagher, Park Benjamin, Albert Pike, Jones Very, Ralph Hoyt, W. G. Clark, Seba Smith, W. E. Channing, H. T. Tuckerman, H. B. Hirst, W. H. C. Hosmer, Epes Sargent, T. W. Parsons, A. C. Coxe, G. H. Colton, W. W. Story, W. R. Wallace, T. D. English, C. G. Eastman, P. P. Cooke, H. A. Caldwell, C. P. Cranch, W. H. Burleigh, H. R. Jackson, Isaac McLellan, and J. T. Fields; and among the younger writers J. R. Thompson, G. H. Boker, T. B. Read, Bayard Taylor, R. H. Stoddard, W. Allan Butler, P. Y. Hayne, C. G. Leland, R. T. S. Lowell, H. H. Caldwell, T. B. Aldrich, A. J. H. Duganne, and E. C. Stedman. The female poets of the period comprise Mrs. Sigourney, author of many beautiful pieces characterized by feminine delicacy and religious sentiment; Mrs. Maria Brooks (Maria del' Occidente, 1795–1845), whose principal poem, "Zophiel," evinces a high degree of imaginative power, and was praised by Southey; Lucretia Maria Davidson (1808–'25), and her sister Margaret Miller Davidson (1823–'38), who are instances of rare though melancholy precocity in the art; Mrs. Frances Sargent Osgood (1812–'50), remarkable for her playfulness of fancy and facility of expression; Miss H. F. Gould, a pleasing and natural writer; Mrs. Julia Ward Howe (born 1819), whose "Passion Flowers" and other poems are distinguished by a peculiar earnestness of feeling and expression; Mrs. Frances Anne Kemble (born 1811), who exhibits similar characteristics; Mrs. E. Oakes Smith, author of a melodious and imaginative poem entitled "The Sinless Child;" Mrs. Caroline Gilman, Mrs. Lippincott (Grace Greenwood), Mrs. A. B. Welby, Mrs. E. C. Embury, Mrs. Louisa McCord, Mrs. Sarah Helen Whitman, Mrs. A. C. (Lynch) Botta, Mrs. Estelle Anna Lewis, Mrs. Haven, Miss Alice Carey and her sister Phœbe Carey, Mrs. Ellet, Mrs. S. J. Hale, Miss Caroline May, Mrs. Maria Lowell, Miss Edna Dean Proctor, Mrs. E. P. Lee, Mrs. Rosa V. Johnson, Mrs. L. V. French, Mrs. M. E. Hewitt (Stebbings), Miss Rose Terry, Mrs. M. S. B. Dana (Shindler), and many others. Moral purity, love of nature, domestic affection, and graceful expression are the general characteristics of the writings of the above; and so far as their poetry has exercised any influence on practical life, it has had a tendency to refine taste and cultivate good sentiments. Dramatic literature has been cultivated by comparatively few writers, and, with occasional exceptions, nothing of very decided mark, either in style, sentiment, or plot, has yet been accomplished. J. A. Hillhouse (1789–1841), a man of ripe scholarship and fine taste, excelled in that species of poetic literature illustrated by the writings of Browning, Henry Taylor, and others in England, and which may be called the written drama. His "Hadad," founded upon Jewish tradition, "Percy's Masque," and other dramas, though unfitted for representation, are conceived with taste and carefully finished. G. H. Boker has produced "Calaynos," a tragedy founded on an incident in the history of the Spanish Moors, and other dramatic pieces of more than ordinary merit; and Mrs. J. W. Howe, a high-wrought drama entitled "The World's Own." Among other works of this class may be mentioned "Brutus," by J. H. Payne; "Metamora," by J. A. Stone; "Jack Cade," by R. J. Conrad; "Tortesa the Usurer" and "Bianca Visconti," by N. P. Willis; "Velasco," by Epes Sargent; "The Gladiator," by R. M. Bird; "Witchcraft," by Cornelius Mathews; and "Fashion," by Mrs. A. C. (Mowatt) Ritchie (born 1821); several of which have proved good acting plays, and still retain possession of the stage. In the department of poetry may also be classed several writers who have executed metrical translations of merit from the German, Italian, and other languages. The most eminent of these is Longfellow, whose versions of Bishop Tegnér's "Children of the Lord's Supper," and the *Schwarze Ritter* and other ballads by Uhland, are well known. C. T. Brooks has translated the *Faust* of Goethe and numerous other pieces from the German; C. G. Leland, some of the choicest songs of Heine; W. H. Furness, Schiller's "Song of the Bell;" and N. L. Frothingham and J. S. Dwight, many of the minor poems of this and other German authors. T. W. Parsons has made one of the best English translations of Dante's great epic; George Ticknor has versified choice extracts from the Spanish poets; and R. H. Wilde, Dr. Mitchell, and Mrs. Nichols have translated with taste from Tasso, Sannazaro, and Manzoni.—Under the head of criticism, essays, belles-lettres, lectures or discourses, and that species of miscellaneous works which owe their charm to a felicitous blending of fact and fancy, or of sentiment and thought, may be classed a numerous body of authors who were so inadequately represented in the two preceding periods that the department now under consideration may almost be said to have sprung into existence since 1820. The establishment of the "North American Review" in 1815, followed within a few years by that of the "American Quarterly Review," the "Southern Quarterly Review," the "Christian Examiner," the "Knickerbocker Magazine," and other periodicals, gave the first considerable impulse to literary criticism and essay writing on a comprehensive and philosophic scale; and the production of the essays of William Ellery Channing (1780–1842) on "National Literature," "Milton," "Napoleon Bonaparte," "Fénélon," and "Self-Culture," and of the thoughtful and highly finished articles by R. H. Dana, published in his own "Idle Man" and the "North American Review," may be said to have formed an era in the literary history of the country. Contemporary with these were John Quincy Adams, William Tudor, Joseph Story, Edward and A. H. Everett, W. H. Prescott, F. C. Gray, George Ticknor, E. T. Channing, Robert Walsh, G. C. Verplanck, J. G. Palfrey, Jared Sparks, Samuel Gilman, William Ware, R. C. Sands, Orville Dewey, Dr. J. W. Francis, W. G. Simms, John Neal, Francis Wayland, Henry Reed, F. L. Hawks, C. S. Henry, J. T. Buckingham, and H. S. Legaré, most of whom have written with taste upon subjects connected with philosophy, morals, political and social economy, and general literature. Prominent among the later review writers and essayists is R. W. Emerson, an original and independent thinker, whose views of religion and in some degree of society may be described as the opposite of all those founded upon tradition and authority. He has written in an abstract manner upon social, moral, and political questions; and his style, though sometimes obscure by reason of his attempts to condense a philosophic theory into a few brief terms, has a finished beauty and significance which have secured him a wide circle of admirers, particularly in New England, where, says Hawthorne, "his mind acted upon other minds of a certain constitution with wonderful magnetism, and drew many men upon long pilgrimages to speak with him face to face." His published works comprise several series of "Essays," "The Method of Nature," "Representative Men," "English Traits," and "The Conduct of Life," several of which have been expanded from lectures and addresses, a department of literature to which he has principally devoted himself. Of the school of Emerson was Margaret Fuller Ossoli (1810–'50), author of "Woman in the Nineteenth Century," an earnest protest against the commonly received views of the social position of women, and "Papers on Literature and Art," some of which originally appeared in the "Dial," a quarterly publication which was for several years the organ of Emerson and his friends. She wrote with point and brilliancy, and in general acquirements and conversational powers was probably the leading woman of her time in America. The most conspicuous names among the younger writers are those of E. P. Whipple, author of many papers, chiefly on literature, written in a lively and perspicuous style; H. T. Tuckerman, whose contributions to the critical literature of the country show a refined taste and a liberal cultivation of mind and heart; O. A. Brownson, a bold and powerful writer on religion, metaphysics, and politics; G. S. Hillard, C. C. Felton, F. H. Hedge, G. E. Ellis, W. H. Furness, W. B. O. and O. W. B. Peabody, G. H. Calvert, Henry Giles, Mrs. Mary Putnam, R. W. Griswold, J. F. Clarke, A. P. Peabody, C. H. Brigham, O. B. Frothingham, and Thomas Hill. Any thing like a complete enumeration of the writers who have gained distinction in the wide field of belles-lettres or magazine literature would be impossible within the limits of this article; and only those who are generally known or who may stand as representatives of their class can be mentioned. The most distinguished of all is Washington Irving, whose "Crayon Papers," published in England in 1822 under the title of "The Sketch Book," represents perhaps the author's most successful attempts in elegant literature. The "Inklings of Adventure," "Pencillings by the Way," "Letters from under a Bridge," and other piquant sketches of people and manners, by N. P. Willis; the series of discursive essays by O. W. Holmes, entitled the "Autocrat of the Breakfast Table" and the "Professor at the Breakfast Table;" the "Reveries of a Bachelor," by D. G. Mitchell (Ik Marvel); the "Potiphar Papers," by G. W. Curtis; "Meister Karl's Sketch Book," by C. G. Leland; and the "Fern Leaves" of Mrs. Parton, are popular examples of what has been accomplished by other authors. To these names may be added those of John Sanderson, G. W. Bethune, M. M. Noah, N. Biddle, Mrs. C. Gilman, James Lawson, T. S. Fay, R. M. Charlton, J. J. Jarves, A. K. Gardner, A. B. Alcott, C. F. Hoffman, E. S. Gould, E. Sanford, J. L. H. McCracken, G. H. Calvert, L. L. Noble, Park Benjamin, W. G. and L. G. Clark, E. A. Poe, Mrs. Kirkland, Theodore Sedgwick, H. W. Herbert, H. B. Wallace, C. W. Webber, G. W. Peck, W. E. Burton, Robert Turnbull, J. L. Motley, Miss Susan Fenimore Cooper, Mrs. Botta, Epes Sargent, Robert Tomes, C. C. Pise; and the following, which of late years have been more immediately before the public: H. D. Thoreau, E. H. Chapin, Samuel Osgood, H. W. Bellows, Parke Godwin, J. R. Lowell, C. A. Bristed (Carl Benson), J. G. Holland (Timothy Titcomb), R. G. White, J. Milton Mackie, T. W. Higginson, R. Strother, C. F. Briggs, E. E. Hale, G. D. Prentice, George Sumner, C. E. Norton, and Theodore Winthrop. Among the works illustrating English literature may be mentioned the lectures on Shakespeare by R. H. Dana and H. N. Hudson, and the editions of the poet by G. C. Verplanck, H. N. Hudson, and R. G. White; the edition of Spenser by G. S. Hillard; those of Wordsworth and Gray by Henry Reed; that of Milton by C. D. Cleveland; that of Coleridge by W. T. G. Shedd; the elaborate series of British poets by F. J. Child, assisted by J. R. Lowell and others; and various writings by R. H. Dana, A. H. Everett, J. R. Lowell, J. S. Hart, E. P. Whipple, and R. W. Emerson. Translations from the German metaphysicians and historians have been made by George Bancroft, S. M. Fuller, G. H. Calvert, W. H. Channing, F. H. Hedge, and Samuel Osgood; and from educational and scientific authors as well as writers of fiction in Germany and France, by a variety of hands.—The department of oratory and political science, though relatively less prominent than in the preceding period, occupies an important place in contemporaneous American literature; and the speeches and writings of Daniel Webster (1782–1852), Henry Clay (1777–1852), and J. C. Calhoun (1782–1850), considered merely as literary productions, are among the intellectual triumphs of the country. For dignity of expression, breadth and force of thought, and a style strong, simple, and sometimes grand, the forensic arguments and public and political speeches of Webster may rank with the masterpieces of oratory in any language. The spontaneous, impassioned eloquence of Clay, on the other hand, depended so much for its effect upon the voice and manner of the speaker, that his reputation will be mostly traditional. His published speeches give little indication of the mastery of the feelings for which he was almost unrivalled. Calhoun's eloquence was plain, strong, concise, and only occasionally impassioned; and his power, as Webster has observed, "consisted in the plainness of his propositions, the closeness of his logic, and in the earnestness and energy of his manner." His literary remains exhibit unusual philosophical acumen and power of analysis. To the political orators and statesmen of this period belong also John Quincy Adams (1769–1848), remarkable for the universality of his knowledge and his independence of judgment; John Randolph of Roanoke (1793–1832), an eccentric but powerful and pointed speaker, and a master of invective; Albert Gallatin (1761–1849); R. Y. Hayne (1791–1839), the eloquent antagonist of Webster; De Witt Clinton (1769–1828), Tristam Burgess (1770–1853), George McDuffie (1788–1851), Silas Wright (1795–1847), H. S. Legaré (1797–1843); W. C. Preston (1794–1860), and S. S. Prentiss (1808–'50), whose productions represent the most ornate and florid school of American oratory; T. H. Benton (1782–1858), whose "Thirty Years' View" and "Abridgment of the Debates in Congress" afford invaluable materials to the historian of national politics; A. H. Everett (1792–1847), J. R. Poinsett (1779–1851), Lewis Cass (born 1782), Levi Woodbury (1789–1851), Caleb Cushing (born 1800), John Sergeant (1779–1852), W. H. Seward (1801), J. J. Crittenden (1785), J. M. Hammond (1807), R. C. Winthrop (1809), H. A. Wise (1806), S. A. Douglas (1813–'61), and R. M. T. Hunter (1809). The most accomplished orator of the period with respect to rhetorical finish and elocution is Edward Everett (born 1794), whose productions, including his oration on Washington, which has been delivered before public assemblies in many parts of the country, are thoroughly American in tone, and possess a permanent and intrinsic merit. Rufus Choate (1799–1859), in his forensic arguments and occasional public addresses, exhibited not less rhetorical excellence and more fervor than Everett; and Charles Sumner (born 1811) excels in strength and clearness of statement, ripe scholarship, and nobility of diction. Among the anti-slavery orators, to which class Mr. Sumner properly belongs, may be enumerated Wendell Phillips (born 1811), a vigorous and impulsive speaker, frequently rising to a strain of impassioned eloquence; J. R. Giddings (1795), Cassius M. Clay (1810), Theodore Parker (1810–'60), Henry Ward Beecher (1813), R. W. Emerson, Frederic Douglass (1817), and G. B. Cheever (1807), whose oratory in general exhibits similar characteristics. The list of occasional orators, in addition to the names of most of the foregoing, includes those of Joseph Story (1779–1845), James Kent (1763–1847), G. C. Verplanck (1786), Horace Binney (1780), T. S. Grimke (1786–1834), Orville Dewey (1794), Horace Bushnell (1802), E. H. Chapin (1814), H. B. Bascom (1796), G. S. Hillard (1808), H. W. Bellows (1814), and many others. The political writers comprise William Sullivan, (1774–1839), Matthew Carey (1760–1830), J. T. Buckingham, Martin Van Buren (1782–1862), W. L. Marcy (1786–1857), Thomas Ritchie, Joseph Gales, Robert Walsh, Isaac Hill, William Leggett (1802–'39), Amos Kendall, Calvin Colton, J. H. Hammond, Nathan Hale, David Hale, Richard Hildreth, Joshua Leavitt, Morton McMichael, Hamilton Pleasants, T. R. R. Cobb, G. D. Prentice, W. C. Bryant, J. G. Palfrey, Robert Barnwell Rhett, Joseph Chandler, James Gordon Bennett, J. D. B. De Bow, John Fletcher, George Fitzhugh, J. L. O'Sullivan, Edwin Croswell, Thurlow Weed, J. W. Forney, Horace Greeley, Parke Godwin, H. J. Raymond, N. Paschall, B. Gratz Brown, C. H. Ray, James Brooks, Erastus Brooks, and many others. Under this head also come the comprehensive "Commentaries on the Constitution of the United States," by Justice Story, the lectures on the same subject by W. A. Duer (1780–1858), and the "Constitutional History of the United States," by G. T. Curtis. The most eminent writers on political economy are H. C. Carey (born 1793), whose "Principles of Political Economy," "Credit System in France, England, and the United States," "The Past, the Present, and the Future," and numerous other works, maintain protection doctrines in a clear, terse style; President Francis Wayland (born 1796) and Henry Vethake, the latter an advocate of free trade, who have published valuable text books on the subject; Francis Lieber, A. H. Everett, William Leggett, Beverly Tucker, Albert Gallatin, John Bristed, Calvin Colton, Condy Raguet, Stephen Colwell, Francis Bowen, Alonzo Potter, E. C. Seaman, E. Peshine Smith, George Opdyke, W. M. Gouge, and William Maclure. The writers on social science and ethics comprise Francis Lieber, author of treatises on "Liberty and Self-Government" and "Political Ethics;" G. H. Calvert, T. Sedgwick, A. Gurowski, Bishop J. H. Hopkins, who have discussed the subject generally. W. L. Garrison, Richard Hildreth, T. D. Weld, H. R. Helper, M. D. Conway, E. M. Stearns, T. Stringfellow, G. Fitzhugh, A. T. Bledsoe, and others have written on the institution of slavery; W. P. Foulke, L. Dwight, J. S. Gould, and Miss Dorothea L. Dix, on prison discipline and kindred topics; and Mrs. C. H. Dall on the rights of woman.—In no department has the intellectual development of the country been more conspicuous than in that of jurisprudence, and the treatises, digests, and reports emanating from American authors and jurists already fill several thousand volumes, and form a valuable addition to legal literature. The "Commentaries on American Law," by James Kent, published in 1826–'30, are written with great clearness and force of reasoning, and constitute the chief manual of general reference and elementary instruction. Of the numerous works of Justice Story, those on equity jurisprudence, partnership, bailments, and "The Conflict of Laws," are well known everywhere; the "Elements of International Law" and "History of the Law of Nations," by Henry Wheaton, have become standard works of reference in Europe; and the treatises of Edward Livingston on penal law, of Simon Greenleaf on evidence, of Willard Phillips on insurance, of F. Wharton on criminal law, beside many by David Hoffman, St. George Tucker, J. K. Angell, John Bouvier, G. T. Curtis, L. S. Cushing, W. A. and John Duer, F. Hilliard, Murray Hoffman, Theophilus Parsons, Theodore Sedgwick, W. W. Story, and others, are creditable to the legal learning of the country. —The theological and religious writers of the period comprise a numerous and able body, whose works, devoted rather to practical illustration than to theoretical speculation, have in many instances become standard authorities on the subjects of which they treat, and, in view of the multiplicity of sects from which they emanate, express unusually broad and catholic views. In the department of biblical criticism American theologians are everywhere honorably distinguished. Of Presbyterian writers, the most eminent are Samuel Miller (1769–1850), author, among other works, of several treatises on the distinguishing features of Presbyterianism; Edward Robinson (born 1794), best known by his researches in biblical geography; Albert Barnes (1798), whose "Notes on the Gospels" and commentaries on other portions of Scripture are widely known in America and England; Nicholas Murray (Kirwan), author of several controversial publications; S. Davies, Ashbel Green (1762–1848), Gardiner Spring (1785), Charles Hodge (1797), James Richards (1793–1843), R. J. Breckinridge (1800), Archibald, J. W., and Joseph A. Alexander, T. H. Skinner, I. S. Spencer, William Adams, Thomas Smyth, Robert Baird, J. H. Thornwell, and J. B. Walker. The Trinitarian Congregationalists are represented by Moses Stuart (1780–1852), author of various scriptural commentaries, and distinguished as a philologist; Leonard Woods (1798–1854), Horace Bushnell (born 1802), Edwards A. Park (1808), Lyman Beecher (1775), Edward Beecher (1804), N. W. Taylor, Bennet Tyler, E. N. Kirk, Nehemiah Adams, Mark Hopkins, Nathan Lord, Joel Hawes, Leonard Bacon, G. B. Cheever, J. P. Thompson, T. C. Upham, J. Torrey, W. G. T. Shedd, Henry B. Smith, and George Punchard, author of a "History of Congregationalism," &c. At about the commencement of this period a memorable controversy took place in New England between Samuel Worcester, representing the conservative or orthodox Congregationalists, and W. E. Channing in behalf of the Unitarians, who thenceforth became an independent, and, in proportion to their numbers, an important sect. The writings of Channing had great influence in moulding the opinions now generally held by Unitarians in America, and contemporary with him were a body of divines and scholars of considerable literary culture, resident chiefly in Boston and its vicinity, and whose education was acquired at Harvard college, where a large proportion of the Unitarian clergy have since been graduated. Prominent among these were Andrews Norton (1786–1853), author of a treatise on the "Genuineness of the Gospels;" Henry Ware, Henry Ware, jr., and William Ware, J. G. Palfrey, Jared Sparks, N. L. Frothingham, James Walker, Orville Dewey, F. W. P. Greenwood, W. H. Furness, and G. W. Burnap. Of somewhat later date are A. P. Peabody, Samuel Osgood, F. H. Hedge, G. E. Ellis, H. W. Bellows, A. A. Livermore, C. A. Bartol, A. B. Muzzey, and J. F. Clarke. Distinguished from these is a new rationalistic school of Unitarianism, chiefly represented by Theodore Parker (1810–'60), whose writings evince profound scholarship and logical method, and furnish frequent examples of rhetorical beauty and force. On political and social questions he also wrote and spoke with peculiar earnestness. The principal writers of the Protestant Episcopal denomination are Bishop C. P. McIlvaine, author of a treatise on the "Evidences of Christianity;" Bishop T. C. Brownell, author of commentaries on the "Book of Common Prayer;" Bishops Alonzo Potter, George Burgess, J. M. Wainwright, J. H. Hopkins, and W. I. Kip; S. F. Jarvis, S. H. Tyng, F. L. Hawks, J. S. Stone, A. C. Coxe, S. H. Turner, G. T. Bedell, R. A. Hallam, T. W. Coit, F. D. Huntingdon, Calvin Colton, G. C. Verplanck, A. H. Vinton, J. A. Spencer, and Samuel Seabury. Among the Baptists, the most noted are President Francis Wayland, William Hague, H. B. Hackett, H. J. Ripley, Baron Stow, Alvah Hovey, W. R. Williams, T. J. Conant, J. Belcher, R. Turnbull, Richard Fuller, and J. B. Jeter; and among the Methodists, Nathan Bangs, P. D. Gorrie, John and Robert Emory, Stephen Olin, H. B. Bascom, D. D. Whedon, J. McClintock, Abel Stevens, W. P. Strickland, D. Curry, James Floy, D. Wise, Osmyn Baker, Thomas Stockton, B. F. Tefft, and Alexander Green. The Roman Catholics are represented by Archbishops F. P. and P. R. Kenrick and John Hughes, the last two chiefly distinguished as controversial writers; Bishops J. England and H. Spaulding; I. T. Hecker and O. A. Brownson, who has written several of his most noticeable review articles on theological subjects. In other denominations the prominent names are George Bush, a follower of Swedenborg, and author of a treatise on the "Doctrine of the Resurrection of the Body" and numerous commentaries and miscellaneous writings; Philip Schaff, J. W. Nevin, and H. Harbaugh, of the German Reformed, and S. S. Schmucker, of the Lutheran church; Hosea Ballou, E. H. Chapin, and T. Whittemore, of the Universalist denomination; and T. Evans and S. M. Janney, members of the society of Friends. Many of the above, including Brownson, Parker, Walker, and Wayland, have written on moral philosophy and metaphysics. The school of Locke is represented by Francis Bowen, Frederic Beasley, and others; while Parker, Walker, James Marsh, and Emerson have borrowed more or less from the German idealists and the French eclectics. C. S. Henry and O. W. Wight have made the philosophy of Cousin familiar to American readers; J. Marsh has expounded the doctrines of Coleridge; and Samuel Tyler has produced, in his "Discourse on the Baconian Philosophy," one of the most profound metaphysical disquisitions of the century. Other contributors to this department are Herman Hooker, Hubbard Winslow, Joseph Haven, H. P. Tappan, Asa Mahan, T. C. Upham, Henry James, Roswell Park, W. T. G. Shedd, W. D. Wilson, Job Durfee, L. P. Hickok (whose systematic writings on the higher branches of philosophy are among the ablest specimens of profound discussion), and George Payne.—Under the head of philology may be mentioned the two great dictionaries of the English language by Noah Webster (1758–1843) and Joseph E. Worcester (born 1784), which have superseded all others in popular use in the United States; the "Lectures on the English Language" and other works by G. P. Marsh; the "Dictionary of Americanisms," by J. R. Bartlett; and the writings of Goold Brown, W. S. Fowler, and others who have devoted themselves particularly to the structure and etymology of the English language. The aboriginal languages of North America have been treated by John Pickering, Albert Gallatin, H. R. Schoolcraft, P. E. Duponceau, E. G. Squier, W. W. Turner, and Mrs. Eastman; and grammars and vocabularies of the most important dialects have been prepared by missionaries and others specially interested in the subject. In oriental literature the investigations of American philologists have been of great value; and to American scholars, and particularly missionaries, Europe is largely indebted for its knowledge of a number of the languages of eastern Asia, Africa, and the Pacific islands. Among those who have gained eminence by their contributions to biblical philology are Edward Robinson and Tayler Lewis, both also distinguished as Greek scholars; Moses Stuart, S. H. Turner, J. W. Gibbs, B. B. Edwards, G. R. Noyes, George Bush, T. J. Conant, and H. B. Hackett. In other branches of oriental philology the chief works are the "Burmese Dictionary," by Adoniram Judson; the "English and Chinese Vocabulary," by S. Wells Williams; and the "Grammar and Dictionary of the Karen Language," by F. Mason; beside the writings of W. W. Turner, Professors W. D. Whitney and E. E. Salisbury of Yale college, J. G. Palfrey, E. Riggs, W. W. Greenough, and Charles Kraitsir, several of whom have contributed important papers to the "Journal of the American Oriental Society." Among miscellaneous philological writers may be enumerated C. A. Goodrich, Professor Schele de Vere, and Horatio Hale, author of the "Ethnography and Philology of the United States Exploring Expedition" under the command of Capt. Wilkes.—The contributions to ethnology comprise some of the most costly works which have yet appeared from the American press. Among these may be enumerated the "Crania Americana," "Crania Ægyptica," and other works by S. G. Morton (1799–1851); the "Biblical and Physical History of Man," by J. C. Nott (born 1804); the elaborate "Types of Mankind" and "Indigenous Races of the Earth," both profusely illustrated, by J. C. Nott and G. R. Gliddon; the "Diversity of Origin of Human Races," by Louis Agassiz (born 1807); the "Doctrine of the Origin of the Human Race," by John Bachman; the "Progress of Ethnology," by J. R. Bartlett; the "Races of Men and their Geographical Distribution," by Charles Pickering; and other works by Arnold Guyot, F. W. Redfield, T. Smyth, and A. Meigs. Intimately connected with this department are the works illustrating the origin and antiquities of the aboriginal tribes of America, the most important of which are the elaborate series by H. R. Schoolcraft, and more particularly his "Historical and Statistical Information" previously mentioned; the "American Antiquities and Researches into the Origin of the Red Race," by A. W. Bradford; the "Ancient Monuments of the Mississippi Valley," by E. G. Squier and E. H. Davis; the "Aboriginal Monuments of the State of New York," and the "Serpent Symbol," by E. G. Squier; and various writings by Albert Gallatin, J. L. Stephens, W. W. Turner, G. Catlin, and others.—The number of works devoted to travel and exploration is greatly in excess of that of either of the preceding periods; and the contributions to geographical knowledge, particularly on the American continent, have been numerous and important. Among the works illustrating European travel and scenery may be mentioned "Pleasant Memories of Pleasant Lands," by Mrs. Sigourney; "The Old World and the New," by Orville Dewey; "Letters from Abroad," by Miss Sedgwick; "A Year in Spain" and "Spain Revisited," by A. S. Mackenzie; "Pencillings by the Way," by N. P. Willis; "The Pilgrim in the Shadow of Mont Blanc," by G. B. Cheever; "Six Months in Italy," by G. S. Hillard; "Views a-Foot" and other works by Bayard Taylor (born 1825), one of the most active and entertaining of modern travellers; "Sunny Memories of Foreign Lands," by Mrs. Stowe; "Hungary in 1851" and "The Norse Folk," by C. L. Brace; and many by W. C. Bryant, William Ware, Caleb Cushing, H. T. Cheever, J. T. Headley, Calvin Colton, Pliny Miles, Benjamin Silliman, S. I. Prime, Horace Greeley, H. T. Tuckerman, J. A. Dix; R. Sanderson, Mrs. Kemble, Mrs. Octavia W. Le Vert, Miss A. C. Johnson, and others. The most noticeable books upon the East are the two series of "Biblical Researches in the Holy Land," by Edward Robinson, the result of an extended tour in the East, and which are regarded by biblical scholars everywhere as of the highest value; "Travels in Egypt, Arabia Petræa, and the Holy Land," by J. L. Stephens; "The Land and the Book," by W. M. Thomson;

"The Pathways and Abiding Places of Our Lord," by J. M. Wainwright; "Nile Notes of a Howadji" and "The Howadji in Syria," by G. W. Curtis; "Boat Life in Egypt and Nubia" and "Tent Life in the Holy Land," by W. C. Prime; "Yusef," by J. Ross Browne; "The Middle Kingdom," by S. Wells Williams; beside others by Bayard Taylor, W. Colton, Horatio Southgate, Stephen Olin, S. I. Prime, and R. B. Minturn. Books of maritime adventure or travel may be represented by W. S. W. Ruschenberger's "Voyage round the World" and "Three Years in the Pacific;" R. H. Dana, jr.'s "Two Years before the Mast;" Walter Colton's "Deck and Port," and other works; H. T. Cheever's "Island World of the Pacific;" H. A. Wise's "Los Gringos;" and Charles Nordhoff's "Man-of-War Life," and other highly graphic narratives of a similar character. Of works relating to the United States and its territories, the most important are Irving's "Astoria" and "Tour on the Prairies," which in point of style and interest are not inferior to any thing he wrote; Timothy Flint's "Residence and Wanderings in the Valley of the Mississippi;" the various narratives of travel on the upper Mississippi by Schoolcraft; Bayard Taylor's "El Dorado;" the accurate and graphic "Journey in the Seaboard Slave States," "Journey through Texas," and "Journey in the Back Country," by F. L. Olmsted; and many by George Catlin, G. W. Kendall, J. T. Headley, T. B. Thorpe, H. Greeley, C. W. Webber, F. Parkman, and others. The geography and antiquities of Central America have been elaborately described by J. L. Stephens in his "Travels in Central America" and "Incidents of Travel in Yucatan;" by E. G. Squier in his "Nicaragua" and "Notes on Central America;" and by B. M. Norman in his "Ruined Cities of Yucatan." Among other works relating to the American hemisphere are F. F. Holton's "New Granada;" C. S. Stewart's "Brazil and La Plata;" "Brazil and the Brazilians," by D. P. Kidder and J. C. Fletcher; John Bigelow's "Jamaica in 1850;" R. B. Kimball's "Letters from Cuba" and "Cuba and the Cubans;" W. H. Hurlburt's "Gan Eden, or Pictures of Cuba;" and F. S. Cozzens's "Acadia." A peculiar and important class of books of travel has resulted from the explorations undertaken at various times by the United States government, with a view of adding to the general stock of geographical knowledge, or of developing the resources of its own territory. The most elaborate of these is the "Narrative of the United States Exploring Expedition around the World," by Capt. Charles Wilkes, in 5 volumes; and of not less importance to the cause of geographical science are the narratives of exploration among the Rocky mountains and in Oregon and California by Col. John Charles Fremont, for which he received the gold medal of the royal geographical society of Great Britain; and the reports of expeditions to the Red river of Louisiana, by Capt. R. B. Marcy; to Texas and New Mexico, by J. R. Bartlett; to Utah, by Capt. Howard Stansbury; to Arizona and the Gila river, by Lieut. Col. W. H. Emory; to the southern hemisphere, by Lieut. J. M. Gilliss; to Japan, by Commodore M. L. Perry; to the Rio de La Plata, by Lieut. T. S. Page; to the Amazon, by Lieuts. W. L. Herndon and L. Gibbon; and to the Dead sea, by Lieut. W. F. Lynch. The chief arctic explorers are Elisha Kent Kane (1820–'57), whose narratives of the two Grinnell expeditions in search of Sir John Franklin are among the most interesting works of their class yet produced; and I. I. Hayes, author of "An Arctic Boat Journey."—The wide field of natural history has been explored during this period with results highly creditable to the sagacity and industry of American philosophers. The most important work in this department, and the most costly ever published in the country, is the "Birds of America," by John James Audubon (1780–1851), remarkable for the vivacity of its descriptive passages and its splendid illustrations. American zoology has been further treated by Charles Lucien Bonaparte, Thomas Nuttall, J. P. Giraud, and John Cassin, who have written on ornithology; by Louis Agassiz, whose publications on comparative embryology, ichthyology, the geographical distribution of animals, and analogous subjects, are of the highest order of merit; by J. E. Holbrook, author of the most complete work on North American herpetology yet published; by Thomas Say, T. M. Harris, and J. L. Le Conte, who have written on entomology; and by Zadoc Thompson, A. A. Gould, B. S. Barton, T. A. Conrad, J. D. Dana, Isaac Lea, Jeffries Wyman, J. Bachman, J. E. De Kay, J. D. Godman, V. G. Audubon, S. Kneeland, jr., and a number of others, who have illustrated various branches of the subject. The most eminent writers on botany are Asa Gray, author of several valuable elementary works and manuals; John Torrey, who is now preparing in conjunction with Gray the most complete American flora yet undertaken; Amos Eaton, Stephen Elliot, Thomas Nuttall, A. B. Strong, Jacob Bigelow, D. J. Browne, and Alphonso Wood; on geology, President Edward Hitchcock, Samuel Maclure, W. B. and H. D. Rogers, J. G. Percival, Ebenezer Emmons, T. Sterry Hunt, C. T. Jackson, D. D. Owen, J. D. Whitney, J. W. Forster, W. C. Redfield, C. H. Hitchcock, J. T. Hodge, James Hall, Joseph Leidy, H. C. Lea, and W. W. Mather, of whom the last four are also distinguished as palæontologists; and on mineralogy, Professor J. D. Dana, author of a well known "Treatise on Mineralogy," P. Cleveland, L. C. Beck, and C. U. Shepard. The writers on chemistry include Benjamin Silliman and Benjamin Silliman, jr., Robert Hare, C. T. Jackson, J. W. Draper, Joseph Henry, E. N. Horsford, John Torrey, E. L. Youmans, and Campbell Morfit; and in other branches of natural science the most noted names are M. F. Maury, author of the "Physical Geography of the Sea" and other works, W. C. Redfield, J. P. Espy, and John Brocklesby, distinguished as meteorologists; J. W. Bailey, an eminent microscopist; A. D. Bache, the superintendent of the United States coast survey; Joseph Henry, who has made important discoveries in electro-magnetism; Samuel Forry and Lorin Blodgett, climatologists; and S. C. Walker, B. A. Gould, G. P. Bond, O. M. Mitchel, Denison Olmsted, J. M. Gilliss, Hannah M. Peterson, Maria Mitchell, W. A. Norton, and Elias Loomis, distinguished chiefly as astronomers. The most eminent mathematician whom the country has yet produced is Nathaniel Bowditch (1773–1838), author of a translation, with a commentary, of Laplace's *Mécanique céleste*, and of the well known "Practical Navigator," now in almost universal use. Other writers on mathematics are Benjamin Peirce, Charles Davies, C. H. Davis, and Thomas Hill. Many of the above named have been contributors to the reports and publications of the Smithsonian institution, or have participated in the scientific labors of the United States exploring expedition and similar undertakings.—Of the numerous works on medicine and surgery produced during this period, it will suffice to mention the "Treatise on the Practice of Medicine," by G. B. Wood; "Dispensatory of the United States," by G. B. Wood and F. Bache; "Elements of Medical Jurisprudence," by J. B. and T. Romeyn Beck; "Elements of Pathological Anatomy," by S. D. Gross; "Materia Medica and Therapeutics," by J. Eberle; "The Principles of Surgery," by W. Gibson; "The Elements of Medicine," by S. H. Dickson; the treatises on "Midwifery" and "Diseases of Females," by W. P. Dewees; the treatise on "Obstetrics," by C. D. Meigs; the "Human Physiology" and "Dictionary of Medical Science," by R. Dunglison; "American Medical Botany" and "Nature in Disease," by Jacob Bigelow; "Letters to a Young Physician," by James Jackson; and "Surgical Observations on Tumors," by J. C. Warren; beside which there are many of reputation by D. Hosack, J. W. Francis, S. G. Morton, J. W. Draper, S. Forry, J. Bell, P. Earle, O. W. Holmes, G. S. Bedford, Horace Green, C. A. Harris, W. E. Horner, P. S. Physick, C. Wistar, Martyn Paine, Valentine Mott, J. Pancoast, L. V. Bell, W. W. Sanger, A. Brigham, L. M. Lawson, T. D. Mitchell, T. D. Mütter, Bennet Dowler, J. A. Swett, Daniel Drake, Charles Caldwell, H. H. Smith, E. Parrish, J. King, A. Stillé, Winslow Lewis, G. Hayward, J. W. Smith, P. Townsend, W. W. Gerhard, J. R. Cox, P. F. Eve, S. F. Condie, J. C. Dalton, and W. H. Van Buren. The principal writers of the homœopathic school are C. Hering, E. E. Marcy, J. C. Peters, J. H. Pulte, and C. J. Hempel.—The theory of education has occupied a large share of the attention of American writers during this period; and among many valuable works on the subject may be mentioned the "Lectures on Education," by Horace Mann (1796–1859); "National Education in Europe," by Henry Barnard; "The Theory and Practice of Teaching," by D. P. Page; "The Student's Manual," by John Todd; "University Education," by Chancellor H. P. Tappan: "The School and Schoolmaster," by Bishop Alonzo Potter and G. B. Emerson; beside others by F. A. P. Barnard, William Russell, Barnas Sears, G. F. Thayer, W. A. Alcott, W. C. Woodbridge, Hubbard Winslow, A. B. Alcott, W. H. McGuffey, J. S. Hart, and S. G. Howe. Under this head may also be included the "Five Years in an English University," by C. A. Bristed. The general excellence and enormous production and sale of school books are perhaps the most remarkable features of American literature. It will suffice here to mention the Latin lexicons of F. P. Leverett and E. A. Andrews; the Latin and Greek grammars and elementary books of Andrews, C. C. Felton, Charles Anthon, J. McClintock, J. Hadley, J. R. Boise, A. Crosby, A. Harkness, E. A. Sophocles, P. Bullions, and S. H. Taylor; and the editions of classical authors by President T. D. Woolsey, Anthon, Felton, H. S. Frieze, T. A. Thacher, Tayler Lewis, J. J. Owen, J. L. Lincoln, C. S. Wheeler, and C. K. Dillaway. English grammar and composition have been treated by Samuel Kirkham, Goold Brown, J. Greenleaf, P. Bullions, W. H. Wells, Allan Weld, R. G. Parker, and G. P. Quackenbos; and the spelling books of Noah Webster, C. W. Sanders, and S. Town have had a prodigious circulation. The chief writers of mathematical text books are Daniel Adams, Warren Colburn, C. W. Hackley, C. Davies, E. Loomis, G. R. Perkins, T. Sherwin, B. Greenleaf, F. Emerson, D. Leach, W. M. Gillespie, W. D. Swan, and J. F. Stoddard; and of school geographies, atlases, etc., W. C. Woodbridge, Mrs. Emma Willard, Jesse Olney, J. E. Worcester, R. C. Smith, S. A. Mitchell, F. McNally, and Miss S. S. Cornell.—Among works on the science of war may be mentioned those on military tactics by Lieut. Gen. Winfield Scott (born 1786) and W. J. Hardee; A. Mordecai's "Artillery for the United States Land Service;" D. H. Mahan's works on civil engineering, fortifications, &c.; H. W. Halleck's "Elements of Military Art and Science;" J. A. Dahlgren's "System of Boat Armament" and "Shells and Shell Guns;" C. B. Stuart's "Naval Dry Docks of the United States;" J. G. Barnard's "Notes on Sea Coast Defence;" J. H. Ward's "Elementary Course of Instruction in Ordnance and Naval Gunnery;" De Hart's "Constitution and Practice of Courts Martial;" Col. H. L. Scott's "Dictionary of Military Science;" beside many by J. G. and B. J. Totten, E. L. Viele, W. N. Jeffers, jr., H. D. Grafton, J. G. Benton, and others.—Comparatively few authors have written on the fine arts; the most prominent are W. Dunlap, author of a "History of the Arts of Design in America;" J. J. Jarves, author of "Art Hints" and "Art Studies;" Washington Allston, Horatio Greenough, H. T. Tuckerman, B. J.

Lossing, W. H. Fry, Mrs. H. F. Lee, Thomas Hastings, and Lowell Mason, who have devoted themselves to sculpture, painting, and music. Rural architecture and landscape gardening have been illustrated by A. J. Downing (1815–'52) in a number of gracefully written treatises and essays; and Samuel Sloan, C. Vaux, G. Wheeler, T. W. Walter, R. Upjohn, M. Field, and others have published general works on architecture. Of the numerous works produced on agricultural and horticultural subjects may be cited "European Agriculture and Rural Economy," by H. Colman; the "Farmer's Companion" and "Farmer's Instructor," by Jesse Buel; E. Ruffin's "Calcareous Manures;" R. L. Allen's "American Herd Book" and "American Farm Book;" R. Buist's "American Flower Garden Directory;" Downing's "Fruit and Fruit Trees of America;" "The Fruit Garden," by P. Barry; the "Fruit Trees of America," by C. M. Hovey; the "Muck Manual," by S. L. Dana; H. S. Randall's "Sheep Husbandry;" L. T. Smith's "American Farmer's Hand-Book;" beside many valuable publications by J. S. Skinner, C. L. Flint, J. J. Mapes, D. J. Browne, T. Bridgman, W. Gaylord, L. Tucker, H. S. Olcott, and others. The useful manuals of Mrs. Hale, Miss C. E. Beecher, and Miss Leslie represent the contributions to domestic economy. J. R. Snowden and W. C. Prime are the principal writers on numismatics; E. Jarvis, L. Shattuck, J. Chickering, and J. D. B. De Bow represent the statisticians; James Renwick and Thomas Ewbank the writers on mechanics; H. W. Herbert has a unique reputation as a writer on field sports in America; and C. E. Lester has been a prolific miscellaneous author. Among the miscellaneous literature of the period may be classed the numerous volumes of "Collections" and "Memoirs" illustrating the national history, published by the historical societies of the several states, particularly by those of Massachusetts, New York, and Pennsylvania. The "Archæologia Americana," or transactions of the American antiquarian society, form also a valuable contribution to the archæological literature of the country. Lastly, the foundations of American bibliography have been laid by the valuable works of Isaiah Thomas, O. A. Roorbach, G. P. Putnam, Nicholas Trübner, Herman Ludewig, H. Ternaux, H. Stevens, O. Rich, and E. B. O'Callaghan. The periodical literature of the country is treated under that head, and also under Newspapers.

UNIVERSALISTS, a religious denomination, holding the final destruction of evil, and the restoration of all souls through Jesus Christ. The following statement will probably represent the belief of the great majority of Universalists of the present day. I. They believe that God is infinite in all his perfections, creating man with the fixed purpose that the existence he was about to bestow should prove a final and everlasting blessing; that, foreseeing all the temptations, transgressions, and struggles of man, he shaped his government, laws, and penalties with express reference to these emergencies, and adapted the spiritual forces to the final overcoming of all evil; that being almighty, he can convert and save a world of sinners as easily as he converted and saved Saul of Tarsus or Matthew the publican, and without any more violation of "free agency" in the one case than in the other. They also believe in the perfection of the divine justice; and affirm, on this ground, that God would not impose on finite beings a law infinite in its demands and penalties; but that, being perfectly just, he will deal with every man according to his works, whether good or bad. II. They uniformly reject the doctrine of the Trinity, giving to Christ the second place, and making him subordinate to the Father. They believe that he is gifted with spirit and power above all other intelligences; that he is "God manifest in the flesh," *i. e.*, that God has displayed in him the brightness of his glory and the express image of his person, as in no other being tabernacled in flesh; that he was sent of God to be the Saviour of the world, and that he will actually save it, because God would not offer, nor would Christ accept, a mission which both knew would end in failure; therefore, they say, the work of redemption will be thorough and universal. III. They believe that man was and is created upright, but liable to sin; that transgression comes not out of any original corruption of heart, transmitted from Adam, but out of ignorance and unbelief; that all men are formed, as Adam was, in the moral image of God; and that this image, though it may be disfigured by sin, can never be wholly lost. Faith and regeneration remove the stains and defilements of sin, and renew or reform the soul in the divine likeness. IV. They believe the new birth to be that thorough change of heart which takes place when a man, wrought upon by divine grace, forsakes his sins, or turns from his former life of worldliness and indifference toward God and the Saviour, and is drawn into fellowship with the Holy Spirit, and, thus quickened into new spiritual vitality, consecrates himself to a life of active goodness and piety. This new birth is not supernatural, but the result of appointed means suitably improved. The Holy Spirit blesses the use of these means, and moves upon the heart of the sinner, encouraging, comforting, assisting, sanctifying. They do not believe in instantaneous regeneration, though they allow that there may be a turning point in the life of every man, when his attention is specially directed to religion. Conversion is only the commencement of religious effort. V. They teach that salvation is not shelter nor safety, nor escape from present or future punishment. It is inward and spiritual, and not from any outward evil, but deliverance from error, unbelief, sin, the tyranny of the flesh and its hurtful lusts, into the liberty and blessedness of a holy life, and supreme love to God and man. This is an important doctrinal and practical point with Universalists, and is constantly enforced in their preaching and writings. They urge on all to seek salvation, not from the torments of a future hell, but from the present captivity of sin. In reply to the objection that millions die in sin, in pagan ignorance and unbelief, they answer that no one is wholly saved in this life, but that all men are saved, in a greater or less degree, after death; and assert that the power of Christ over the soul does not cease with the death of the body, but that he continues the work of enlightenment and redemption till he surrenders the kingdom to the Father, which does not take place till after the resurrection is complete. VI. The resurrection is not merely a physical but a moral and spiritual change. It is not only clothing the soul with an incorruptible body, but it is an *anastasis*, a raising up, an exaltation of the whole being into the power and glory of the heavenly; for, "as we have borne the image of the earthy, we shall also bear the image of the heavenly." It is a change, they say, by which we become as the angels, and "are children of God, being (or, because we are) children of the resurrection." It must, therefore, be something more than clothing the soul in a spiritual body. It is, beside this, growth in spiritual strength and power, in knowledge, in holiness, in all the elements and forces of the divine life, until we reach a point of perfectness and blessedness described by the term heaven. This resurrection or lifting up of the soul into the glorified life of the angels, is the work of the Lord Jesus Christ. The end of his mediatorial reign, the completion of his saving work, and the final surrender of his kingdom back to God, does not take place till after this anastasis, or till this uplifting of all the dead and living into "the image of the heavenly" is completed. VII. On the subject of rewards and punishments, the Universalist belief is substantially, that holiness, piety, love of God and man, are their own reward, make their own heaven here and hereafter; and that in the nature of things no other reward is possible. If men love God with all their hearts, and trust in him, they find, and are satisfied with, the present heaven which love and faith bring with them. They hold the same doctrine respecting punishment: that it is consequential, not arbitrary—the natural fruit of sin; that it is for restraint, correction, and discipline; and that God loves as truly when he punishes as when he blesses, never inflicting pain in anger, but only because he sees that it is needed, as medicine is, to prevent a greater evil. They affirm that the law is made for the good of man, and of course that the penalty cannot be such as to defeat the object of the law. Transgression brings misery or punishment, which is designed to correct and restore to obedience, because obedience is happiness. They maintain that pain ordained for its own sake, and perpetuated to all eternity, is proof of infinite malignity; but God, they say, is infinitely beneficent, and therefore all suffering must have a beneficent element in it, all punishment must be temporary and end in good.—The Universalists believe that traces of their main doctrine may be found in the earliest Christian writings. Some of the Gnostic sects held to the final purification of those who died in sin, as the Basilidians, Valentinians, &c. The famous "Sibylline Oracles" (A. D. 150) teach explicitly the doctrine of the final restoration of the lost. As this work was written expressly to convert the pagans to Christianity, Universalists affirm that this is conclusive as to what was regarded as Christianity 50 years after the death of the apostle John. They profess to find the same belief taught in the writings of Clement of Alexandria (200); Origen (203–254); Marcellus, bishop of Ancyra in Galatia (330); Titus, bishop of Bostra (364); Gregory, bishop of Nyssa in Cappadocia (372); Didymus the Blind (370), president of the catechetical school of Alexandria; Diodorus, bishop of Tarsus (378); Theodore, bishop of Mopsuestia (394); and Fabius Marius Victorinus (362–392). Notwithstanding that Universalism, as such, was specially and formally condemned by the second general council of Constantinople in 553, the doctrine survived, and occasionally appeared in strength; as among the Albigenses and Waldenses in the 12th century, the Lollards of Germany in the 14th, the "Men of Understanding" in the 15th, and some of the Anabaptist sects in the 16th. When the reformation began in England, this doctrine rose with it, and was defended with such zeal and success that, in preparing the "Articles of Faith" for the national church, it was thought necessary to introduce a special condemnation in an article afterward omitted. Some of the most eminent members of this church have seemed to sanction the doctrine: Archbishop Tillotson, Dr. Burnet in his *De Statu Mortuorum*, Bishop Newton, Dr. Henry More, William Whiston, David Hartley in his "Observations on Man," and others. Among the dissenters who believed and defended it were Soame Jenyns, Jeremy White, chaplain to Oliver Cromwell and author of "The Restoration of All Things," and William Law, author of the "Serious Call" and "Christian Perfection." The English Unitarians generally believe the doctrine. Universalism prevails extensively in Germany. It is freely accepted also in the French Protestant church. It began to attract attention in America about the middle of the 18th century, but it was not till the arrival of the Rev. John Murray in 1770 that it made much progress. Since that period it has spread with great rapidity. The published "Register" of the denomination for 1862 gives a United States convention, composed of 23 state conventions, in their turn composed of 87 local associations, representing 1,279 societies owning 998 churches, with a ministry of 724 preachers. They have under their patronage 11 institutions of learning, including 3 colleges and 8 academies, and support 17 periodicals. There are also various state missionary, tract, and Sunday school societies, actively engaged in promoting the knowledge and practice of the faith. A general publishing house is in course of establishment, after the model of the Methodists. Relief funds also, for the benefit of aged and destitute ministers, are in progress, one of which, in the state of New York, already has a permanent fund of $15,000. St. Lawrence university, N. Y., with the theological school, has property amounting to $100,000, and a valuable library of 5,000 volumes, mostly purchased in Germany. Tufts college, Mass., opened in 1854, has funds and real estate of not less value than $300,000, and a library of 10,000 volumes. The ecclesiastical government of the denomination is representative and congregational, the associational organizations being chiefly for mutual counsel and assistance.—See "Ancient History of Universalism," by the Rev. Hosea Ballou (12mo., Boston), and the "Modern History," by the Rev. Thomas Whittemore (12mo., Boston, 1830; new ed., vol. i., 1860).

UNIVERSITY (Lat. *universitas*), a corporation consisting of the teachers or teachers and students of one or more departments of knowledge, and other persons who have become associated with them as patrons or otherwise, which corporation has been empowered by the constituted authorities to confer degrees in one or more faculties. The term university had no reference originally to education. It is used by Cicero and other Latin writers to express the idea of completeness. In the code of Justinian it is used to designate a corporation or corporate body, as we sometimes use the word college at the present day. Thus there were in Rome in the 7th and 8th centuries "universities" of tailors, bakers, &c. Its first application to academical institutions was made in the 13th century, and grew out of this very idea of a corporation with which it had become identified. There were schools and seminaries of learning in great numbers before and after the Christian era, some of them, such as the schools of Athens, Alexandria, Edessa, and Tarsus, doubtless answering in many respects to the modern university; but none of them assumed that name, and none were in existence during the dark ages to which it could have been applied prior to the 12th century. There were indeed schools of considerable note, in most instances connected with monasteries or cathedrals, at Oxford, Cambridge, Paris, Bologna, and other cities of Europe, from the 7th or 8th century, at times flourishing, and at other times abandoned. There was also the great educational movement among the Saracens, who for several centuries had their schools deserving the name of universities, in Arabia, Syria, Persia, Egypt, Morocco, and Spain.—The university of Paris, the first distinctive university, grew out of the popularity of the lectures and teachings of William of Champeaux, Abelard, and Peter Lombard, the great masters of the scholastic philosophy, which attracted thousands of students from all parts of Europe. The numerous schools of Paris and its vicinity, some of them connected with monasteries and others independent, taught the *trivium*, grammar, logic or dialectics, and rhetoric, and the *quadrivium*, music, arithmetic, geometry, and astronomy. Of these 7 studies, but few went beyond the *trivium*; and those who attained the whole were regarded as prodigies of learning. (See EDUCATION.) The great influx of students rendered an organization for their government and discipline necessary, and toward the end of the 12th century they seem to have been incorporated as a body of teachers. It is probable that at first there were several of these organizations, for the faculty of arts had assumed a regular form of self-government before 1169, and in that year the rights of the chancellor of Notre Dame were exercised in reference to the faculty of theology. There are in existence two decretals of Pope Alexander III., of about 1180 and 1182, relative to the charging of fees by the chancellor for licenses to teach. The first mention of the rector or head of the university is in an ordinance of Philip Augustus in 1200, though he does not give the name of university to the organization; that was first done in 1215 by Pope Innocent III., who by his decretal of that date regulated its organization and institutions. As thus regulated, all the students and professors were divided into 4 nations, viz.: the French nation, including the French, Italians, Spaniards, Greeks, &c.: the nation of Picardy, which included the N. E. of France and the Netherlands; the nation of Normandy; and the English nation, which included not only the inhabitants of the British isles and Brittany, but Germans, Poles, &c. Each nation elected a procurator (the Germans subsequently elected two, and were responsible only to them) from their own number, whose duty it was to defend the rights and privileges of the nation, convene and preside in its meetings, admit new members, and see that all the statutes were observed. Each nation had its own buildings and church and its great and small seal, was divided into provinces, and each province into dioceses, and was independent in regard to its own affairs. The 4 nations, at first voting collectively, elected a rector; but the predominance of the French nation gave so much dissatisfaction, that eventually he was elected by the 4 procurators. The rector and procurators constituted the council of the university, in which its ordinary powers of government and legislation were vested. There was however a higher officer than these, who was the fountain and source of all honor, and by whose authority alone degrees could be conferred or licenses to teach granted. This was the chancellor, who, if the university was in an episcopal city, was usually the bishop of the diocese. In Paris, the university being partly in the diocese of Paris, and partly in the abbey lands of St.

Geneviève, there were two chancellors; the abbot of St. Geneviève was chancellor of the faculty of arts, while the bishop of Paris was chancellor of the other 3 faculties and of the university at large. To the 4 nations already mentioned were added in 1259 a faculty of theology, under the patronage and influence of the Dominican and Franciscan friars, and soon afterward separate faculties of medicine and canon law; and from 1281 the university consisted of 7 bodies instead of 4, viz., 4 nations and 3 faculties, represented in the government by 4 procurators and 3 deans. To the faculties only doctors, *i. e.*, teachers, could belong; the bachelors and scholars, whether of arts, theology, law, or medicine, were still included in the 4 nations. The great influx of students led to the establishment of colleges, at first merely hostels, in which free board and lodging were furnished to a certain number of indigent students, but subsequently places of instruction also. (See COLLEGE.) They have been mostly confined to France and Great Britain. The academical degrees conferred by the universities seem rather to have originated from the necessities of the case than to have been the result of any deliberate purpose of the officers of any particular university. The term bachelor (*bachelier*) in French originally signified a young man, and was perhaps derived from *bacilla*, a little staff or stick, because the young soldiers on first entering the army exercised with small sticks instead of weapons. It was applied to those who had just passed through the curriculum of study, whether in the arts, theology, medicine, or law, because they were now to be disciplined for the actual conflict of life by practice in teaching. The terms master and doctor were originally synonymous, and both implied persons actually engaged in teaching; after a time, master was confined to those who taught the arts, and doctor to those who gave instruction in theology, medicine, or law. The title professor was given to one who professed to teach a particular subject. There was also a distinction of regents and non-regents (Lat. *rego*, to rule or instruct). The object of acquiring an education in the beginning was to be able to impart instruction, and every bachelor, master, or doctor was obliged to devote a certain period, called a necessary regency, to teaching, after which he might if he chose become a non-regent. The student in the university, at the end of 2 years, became a determiner, that is, he put himself upon repeated trials to determine whether he could become a bachelor; if he passed the examinations after 3½ years' study, he was conducted by the rector to the chancellor, who crowned and blessed him; he then assumed the round hat, and became a bachelor. After 3½ years' more study and repeated examinations, he was if found worthy presented to the chancellor as qualified to receive a license to teach the 7 liberal arts; he was then invested with the master's bonnet, and publicly and solemnly declared a master of arts, and was at liberty to commence his career of teaching. In order however to become a full master, he must offer himself as a candidate to the company of masters of the university, to be admitted as a *socius* or fellow with them. To attain to the doctor's degree in divinity, the master must have studied 9 years, 2 of which must have been passed in the study of the Bible and 2 in Peter Lombard's "Book of Sentences." For the doctorate in law or medicine a shorter time was sufficient. The degree of doctor was conferred jointly by the chancellor and faculty, who exacted a solemn oath of the candidate to maintain their teachings and privileges.—The university of Paris was the model of most of those in France, and of the English universities. The university of Bologna can boast as early and perhaps even an earlier origin, some writers endeavoring to maintain a connection between it and a school established there in 433 by Theodosius II. and revived by Charlemagne. It would appear that the arts were taught there in the 11th century, and perhaps there may have been teachers of law also; but the university first attained prominence and its designation early in the 12th century, from the celebrity of Irnerius, the great teacher of Roman law of that century. It was the most celebrated law school of Europe for several centuries; and though it possessed other faculties, the greater reputation of its legal faculty caused them to be regarded as subordinate. In 1220 its schools were attended by 10,000 students, and in the 14th century the number had increased to 13,000. In this university the students and teachers were divided into *citramontanes*, or natives of Italy, and *ultramontanes*, or foreigners; and these were subdivided into nations, of which there were 17 in the former and 18 in the latter. Each nation had its presiding officer, called a "counsellor," except the German nation, which had instead 2 procurators. The counsellors formed the governing power of the university, and elected the rector and syndic, the former however receiving also the vote of his predecessor and of electors from the university at large. The leading distinction between the university of Paris and that of Bologna was that in the former the masters or teachers (*doctores*) constituted the privileged corporation, to the exclusion of the scholars; while in the latter students formed the university, and elected the academical officers whom the masters and teachers were bound to obey. The rector possessed more power than at Paris, and the chancellors, of whom there were two, only conferred the degrees and honors. The rector possessed supreme civil jurisdiction in all cases relating to the students, and usually might exercise criminal jurisdiction also, if he chose to do so. In 1362 there were in Bologna 4 universities: 2 of law, which however were often reckoned as one; one of medicine, the arts, and scholars of theology; and one of doctors of theology. In Bologna originated the practice of conferring a double doctorate, of both laws, the civil and canon law, perpetuated in our degree of LL.D., and in the J.U.D. (*juris utriusque doctor*) of the German universities. The practice of paying fixed salaries to professors also originated in Bologna, where they were paid as early as 1279.—Before the year 1500 there were in Europe 64 universities, viz.: 15 in France, of which, after that of Paris, those of Montpellier, Toulouse, and Orleans were the most celebrated, the first as a school of medicine, and the last two of law; 19 in Italy, one of them, at Salerno, being probably the earliest in Europe, dating from the 10th century, though for a long time having only a medical faculty, and those of Padua, Ferrara, and Pisa also having a high reputation; 15 in Germany, the Netherlands, and Switzerland, including those of Vienna, Prague, Heidelberg, Cologne, Erfurt, Leipsic, Louvain, Basel, Ingolstadt, and Tübingen; 9 in Spain and Portugal, including Salamanca, Coimbra, Valladolid, Saragossa, and Alcala; 2 in England, Oxford and Cambridge; one in Poland, at Cracow; one in Hungary, at Buda; one in Denmark, at Copenhagen; and one in Sweden, at Upsal.—The English universities, being founded on the model of that of Paris, present in their early history not many items of general interest. Colleges and halls were early established in both, though halls were more frequent in the former; the colleges were at first mere endowments for the support of a certain number of masters and indigent scholars; the halls were at Oxford boarding houses in which the students lived, choosing a graduate of respectable character as their principal. These hostelries were licensed by the university. About the middle of the 16th century the universities experienced their greatest depression; the number of students actually in attendance was very small, and the halls were unoccupied. From the ruin which then befell them the halls have never recovered; and it having been the policy of the heads of the university to discountenance them, there are now but 6 halls at Oxford, while there are 19 colleges, and only one hall or hostel at Cambridge, with 17 colleges. In Oxford, from the commencement of the 15th century, it was required that the students must be members of some college or hall under a responsible head. In Cambridge there has been greater liberty in this respect, and even at the present time nearly 100 of the students are not resident in the colleges. The study of Greek was not pursued at Oxford until the time of Cardinal Wolsey, who founded 7 lectureships, one of them of the Greek language. The business of teaching, originally the function of the universities, was assumed by the colleges as early as the 16th century. The organization of the universities, and their connection with the colleges, are very similar, though different names are given to many of the officers in the two institutions. (See CAMBRIDGE, UNIVERSITY OF, and OXFORD, UNIVERSITY OF.) The university of Durham, organized in 1833, is in its main features a copy of Oxford and Cambridge in little. It has one college and two halls, and is under the general patronage of the bishop of Durham. Of the university of London, as embracing entirely new principles, we shall speak further on. In 1856 an act of parliament was passed, which looked to a thorough reorganization of the two ancient universities, the abolition of sinecures, the greater efficiency of the teaching faculties, and the throwing open of fellowships and scholarships to general competition. The changes brought about by this law are still in progress. The Scottish universities, though not so largely endowed and comprising fewer colleges, were organized much on the Paris model, except that the students were not required to reside in the college buildings. St. Andrew's is the oldest, having been founded in 1411, and had formerly 8 colleges, St. Salvator, St. Leonard's, and St. Mary's. The first two were consolidated in 1747, and the act of parliament in relation to Scottish universities in 1858 requires that the two remaining shall be consolidated. Glasgow university was founded in 1450: that of Aberdeen in 1494, with two colleges, King's and Marischal, now consolidated; and that of Edinburgh in 1582, by James VI. of Scotland. The organization of the 4 Scottish universities is now uniform and assimilated to the new *régime* of the English. They are governed by a chancellor, vice-chancellor, and rector, with the 8 courts, the *senatus academicus*, university court, and general council; the first consists of the principal and faculties; the second of the rector, the principal, the lord provost of Edinburgh, and 5 assessors nominated respectively by the chancellor, the rector, the *senatus academicus*, the general council, and the authorities of the city; and the general council of the masters, fellows, and scholars. In Ireland there are two universities: the university of Dublin, or Trinity college, properly a college with university privileges; and the Queen's university, in which the colleges of Belfast, Cork, and Galway are placed under one governing board.—The French revolution broke up all the old universities of France, but left the colleges (*lycées*) in existence, and the endowments for a portion of the higher faculties. In 1808 Napoleon attempted to consolidate the entire educational system of France under one organization, which he called the university of France. The whole country was divided into 17 districts, each under its own academy, and all subordinate to the central university. Each academy had its faculties and institutions of higher instruction, embracing letters, sciences, medicine, law, and theology; its organizations of secondary instruction, consisting of imperial lyceums, communal colleges, and gymnasia; and its schools of primary instruction, answering to our common schools. This university remained till 1848, when it was merged in the "Superior (now Imperial) Council of Public Instruction." This council consists of 32 members appointed annually, and is under the control of the minister of public instruction.—The German universities were for the most part founded on the model of that of Bologna. They concern themselves only with superior instruction, the rudiments of classical learning, or what we term the collegiate course, being pursued in the gymnasia. They all have the 4 faculties of theology, law, medicine, and philosophy, the last comprehending the subjects usually comprised under literature and science; and some of them add a 5th faculty, that of administrative and political sciences. Each university consists of two corporate bodies, the professors, 30 or 40 in number, who are paid in part by the state and partly by the students, whose attendance is voluntary, and the corporation of students. The administrative body of each university consists of a rector and senate elected by the professors. The students only attend the lectures and examinations, and do not board or lodge in college buildings.—The following table exhibits the condition in several important particulars of the European universities in 1858–'9. France has now no universities, and is consequently omitted, and the returns from Russia, Spain, and Tuscany are so imperfect that we can give little more than their names, date of organization, and number of students.

EUROPEAN UNIVERSITIES.

Countries.	Name.	Date of foundation.	Students.						Teachers.				Remarks.
			Theology.		Law.	Medicine.	Philosophy	Total.	Profess's.		Tutors.	Total.	
			Prot.	R. C.					Ord.	Ext.			
England......	Cambridge ...	1109	..	..	..	..	..	..	25	5	75	105	
"	Oxford	1149	..	..	..	..	..	977	38	..	100	138	
"	Durham	1833	..	..	..	..	..	..	4	..	10	14	
Scotland......	St. Andrew's..	1411	35	..	..	..	..	145	14	..	8	22	110 students at St. Andrew's, 416 at Aberdeen, and 647 at Edinburgh, were under the faculty of arts.
"	Aberdeen.....	1494	91	..	17	189	..	713	22	..	..	22	
"	Edinburgh ...	1582	85	..	236	496	..	1,464	35	..	..	..	
"	Glasgow	1450	..	..	..	..	..	1,127	23	..	..	..	
Ireland.......	Dublin	1591	..	..	..	..	..	1,400	34	..	27	61	
"	Queen's	1845	..	..	28	229	..	566	..	..	..	..	309 students in arts.
Austria.......	Vienna.......	1365	29	200	1,018	656	229	2,132	85	..	23	108	In all these universities, beside a small matriculation fee, the students pay at the rate of 50 cents an hour per week for the lectures during the session. There is at Vienna an Evangelical theological faculty independent of the university, supported by the state, founded in 1818.
"	Cracow.......	1343	..	15	139	82	46	282	..	..	..	40	
"	Prague.......	1348	..	91	587	241	207	1,126	89	..	..	89	
"	Pesth (formerly Buda)....	1465	..	7	530	496	95	1,191	36	16	17	69	
"	Grätz........	1586	..	57	225	..	30	312	20	5	11	36	
"	Olmütz	1581	..	82	..	..	..	82	..	..	..	..	
"	Innspruck....	1672	..	68	192	..	28	288	27	..	..	27	
"	Lemberg	1784	..	210	320	..	50	580	29	..	..	29	
"	Padua........	1228	..	38	645	556	329	1,568	45	..	..	45	
Italy	Pavia.........	1361	..	..	496	360	204	1,060	47	..	16	63	Fees for the entire course in any faculty, from $21 to $49.
"	Modena.......	....	..	..	150	112	208	470	41	..	..	46	Fees from $25 to $85 for a complete course in either faculty. Theology is taught in seminaries.
"	Bologna......	1119	..	10	132	326	64	532	40	..	..	40	The theological seminaries in the provinces, and the Collegio Romano, the seminary of St. Apollinaro, and the college of St. Thomas in Rome, furnish the theological instruction. None of these are connected with the universities. The fees at these universities are about $20 a year.
"	Rome	1303	..	13	349	175	161	698	50	..	..	50	
"	Ferrara.......	1391	..	1	31	20	13	65	20	..	..	20	
"	Perugia	1290	..	2	30	23	26	81	31	..	..	31	
"	Macerata	1290	..	11	53	26	30	120	21	..	..	21	
"	Urbino	1671	..	5	22	9	36	72	20	..	..	20	
"	Camerino	1727	..	3	33	23	4	63	20	..	..	20	
"	Parma	1422	..	60	76	51	162	314	47	..	..	47	A small entrance fee, and $63 on graduation.
"	Piacenza	....	..	..	64	5	90	159	18	..	..	18	
"	Turin	1412	..	3	623	495	255	1,376	84	..	13	97	For theological course, $125; law, $200; medicine, $190; philosophy, $85.
"	Cagliari.......	1606	..	19	66	86	23	194	27	..	..	27	
"	Sassari........	1766	..	17	47	72	..	136	22	..	..	22	
"	Genoa........	1812	..	1	217	111	95	424	37	..	11	48	
"	Naples	1224	..	..	..	..	..	1,550	..	..	..	..	Fees only on taking degrees, varying from $25 to $120.
"	Palermo	1394	..	23	468	254	377	1,122	50	..	..	..	
"	Catania	1445	..	3	238	173	184	603	36	..	..	..	
"	Messina......	1548	..	20	75	44	180	319	30	..	..	..	
"	Pisa	1338	..	..	..	..	..	580	45	..	..	45	
"	Sienna	1361	..	..	..	..	..	257	20	..	..	20	Sienna has only faculties of theology and law, and Florence of law and medicine.
"	Florence......	1438	..	..	..	..	..	218	..	..	..	..	
Prussia.......	Greifswalde...	1456	29	..	38	127	194	288	..	..	..	34	Public lectures are free; matriculation fees from $4.50 to $6.25. Private lectures range from $3 to $14 per session; at Berlin none exceed $8.50 per session.
"	Breslau	1702	101	..	141	112	238	370	..	..	..	51	
"	Königsberg...	1544	140	..	72	94	75	381	29	14	15	58	
"	Halle	1694	361	..	156	71	50	638	37	13	18	68	
"	Berlin	1809	321	..	501	289	356	1,467	29	41	57	147	
"	Bonn	1818	54	230	116	95	275	770	..	..	..	88	
German states	Heidelberg ...	1387	93	..	238	136	97	564	31	18	27	76	Fees from $2 to $5 per session, except at Marburg and Leipsic, where the public lectures are free; private lectures from $3 to $12.50 per session.
" "	Freiburg	1457	..	174	19	53	72	340	24	6	6	36	
" "	Würzburg....	1403	..	92	143	293	139	667	..	..	..	45	
" "	Erlangen	1743	300	..	100	114	47	561	..	..	..	47	
" "	Munich	1826	..	156	557	211	405	1,329	..	..	..	110	
" "	Göttingen	1737	134	..	216	181	158	689	50	17	35	102	
" "	Marburg	1527	78	..	36	69	14	247	32	14	10	56	
" "	Giessen	1607	51	..	41	112	159	363	33	3	11	47	
" "	Rostock	1419	35	..	59	35	..	129	..	..	..	34	
" "	Jena	1558	..	..	..	..	..	380	37	14	7	58	
" "	Leipsic.......	1409	230	..	290	257	70	847	43	36	30	109	
" "	Tübingen	1477	174	141	134	130	80	669	44	6	12	62	

EUROPEAN UNIVERSITIES.—(Continued.)

Countries.	Name.	Date of foundation.	Students.						Teachers.				Remarks.
			Theology.		Law.	Medicine.	Philosophy.	Total.	Profess's.		Tutors.	Total.	
			Prot.	R. C.					Ord.	Ext.			
Belgium......	Brussels......	1834	..	..	163	147	104	414	30	17	..	47	Matriculation fee, $8; annual fee for all the classes in each faculty, $40 to $50. Theology is taught in seminaries not connected with the universities.
"	Liége	1817	..	..	166	149	159	474	..	..	19	60	
"	Ghent........	1816	..	..	78	101	47	226	..	..	..	43	
"	Louvain......	1426	..	82	227	192	253	754	48	..	..	48	
Holland	Leyden	1575	158	..	219	95	39	511	28	..	..	..	Universities supported by the state. There is a small matriculation fee and a graduation fee. The students also pay from $6.25 to $12.50 per session for their lectures.
"	Groningen ...	1614	61	..	81	30	11	183	21	..	..	..	
"	Utrecht	1636	205	..	184	58	22	469	22	..	..	..	
"	Amsterdam...	....	52	..	42	19	2	115	15	..	..	..	
"	Deventer.....	....	3	..	7	2	20	32	7	..	..	..	
Switzerland...	Basel.........	1459	45	..	7	17	13	82	27	8	16	51	Students pay $3.50 matriculation, and from $5 to $10 for lectures.
" ...	Zürich	1833	27	..	26	62	12	127	44	..	17	61	
" ...	Bern.........	1834	34	..	62	76	18	190	34	..	..	34	
Denmark.....	Copenhagen..	1479	..	..	..	..	..	900	41	..	15	56	Matriculation at Copenhagen, $6.50; at Kiel, $4.37; for private lectures, from $2.25 to $5.50 per course.
"	Kiel..........	1665	38	..	57	32	21	148	23	7	14	44	
Sweden.......	Upsal.........	1476	173	..	251	181	846	1,451	31	..	..	31	Public lectures free; private lectures, $1.50 to $3.00 per term; matriculation, $5.60 to $6.75.
"	Lund	1668	84	..	120	68	338	610	28	..	18	46	
Norway	Christiania....	1811	100	..	103	82	204	489	32	..	..	32	
Russia........	Dorpat.......	1632	..	..	..	..	..	555	..	..	..	84	The faculties are not the same as in other universities; they are judicial, historico-philological, mathematical, and medical. In St. Petersburg there is also a faculty of oriental languages. The matriculation fee is $5.20, and there is a very small fee for private lectures.
"	Moscow	1755	..	..	..	..	..	1,725	..	..	..	117	
"	Kasan........	1803	..	..	..	..	..	853	..	..	..	76	
"	Kharkov	1803	..	..	..	..	..	459	..	..	..	79	
"	St. Petersburg	1819	..	..	..	..	..	716	..	..	..	82	
"	Helsingfors...	1828	59	..	89	46	233	427	24	4	16	44	
"	Kiev..........	1833	..	..	..	..	..	906	..	..	..	96	
Greece........	Athens.......	1837	Greek church.	24	263	162	67	516	..	..	..	45	Students pay no fees.
Ionian islands.	Corfu.........	1824	..	..	..	..	..	300	..	..	..	..	
Spain.........	Salamanca....	1240	..	..	..	..	..	300	..	..	..	..	
"	Valladolid	1346	..	..	..	..	..	1,300	..	..	..	..	
"	Valencia	1410	..	..	..	..	..	1,600	..	..	..	..	
"	Saragossa.....	1474	..	..	..	..	..	1,100	..	..	..	..	
"	Seville	1504	..	..	..	..	..	800	..	..	..	..	
"	Granada	1531	..	..	..	..	..	810	..	..	..	..	
"	Santiago......	1532	..	..	..	..	..	1,030	..	..	..	..	
"	Oviedo.......	1580	..	..	..	..	..	450	..	..	..	..	
Portugal......	Coimbra	1290	..	..	464	..	305	769	47	..	39	86	Fees from $21 to $26 per session.

—Within a few years past efforts have been made to attach a new signification to the term university, or rather to apply it to organizations of a different character from those to which it had before been attached. The first experiment of this kind was the establishment of the university of London in 1836. It has no colleges like Oxford and Cambridge, or rather it has affiliated to it nearly all the colleges of the British empire. It has a *senatus academicus*, composed of eminent scholars of all denominations, and boards of examiners before whom the candidate for a degree is rigidly examined; if he passes these, it is of no consequence where he has acquired his knowledge. There are no degrees conferred in course, or *pro causa honoris*. Beside a matriculation examination, other examinations sufficiently strict and thorough to test the candidate's knowledge precede each degree, two being required before conferring the bachelor's degree in arts, science, law, or medicine, and those who cannot pass them are rejected without mercy. Since its organization every dissenting college, and several church colleges in Great Britain and its colonies, have sent their students to its examining boards to obtain their degrees, and a considerable number of the students of Oxford and Cambridge have preferred to pass its examinations. It has accomplished much good in rendering the educational movement freer from form and routine, and yet more thorough. There had existed for many years in England collegiate institutions founded and endowed by dissenters for educational purposes, but which could not enjoy the privileges of the universities, and could not confer degrees upon their graduates, in consequence of their scruples in regard to subscription to the "thirty-nine articles." Lord Brougham and Thomas Campbell in 1825 attempted to remedy this by the organization of the London university (now University college), a collegiate institution which required no religious tests; but this produced some dissatisfaction, and King's college was founded by churchmen who desired to have theology included in the curriculum. Both these institutions are now dependent for their degrees on the university of London.—In the United States there are, properly speaking, no universities. Several American colleges have, indeed, connected with them more or less closely schools of theology, law, medicine, and physical science, or at least some of these faculties; but these are as often called colleges as universities, while frequently institutions of recent origin, and having a mere faculty of the arts and a course of study not above that of a well regulated high school, assume the name of university. We have no university in the continental sense of an institution in advance of the gymnasium or college, and receiving only those who have completed their course there; nor in the English sense of a corporation enclosing within it and governed and controlled by other corporations, with its fellowships, its sinecure professorships, and its ancient and peculiar traditions; nor yet after the model of the university of London. Still, there are two classes of organizations in the United States claiming the name of university, which merit notice. The first are the state universities. In the newer states, grants of land were made by the general government for university purposes; and in Michigan, Wisconsin, Iowa, Alabama, and Mississippi, and perhaps in some of the other states, a sufficient portion of these lands has been sold to furnish a fund for the partial endowment of such universities. Though differing in minor particulars from each other, they agree in being free from denominational control, and in making provision for eventual instruction in law, medicine, physical science, and pedagogy, or the art of teaching; and they usually form the apex of a system of which common schools are the base, and which proceeds upward through the grammar school, high school or academy, and college, to the university. Much of this is yet in theory only. The other organization has but a single example as yet; it is the university of the state of New York, existing only in a board of regents, elected by the legislature on the nomination of the governor. This board has a general oversight of nearly all the colleges and academies of the state, requiring of them full and accurate reports of their professors or teachers and students, the average attendance, financial condition, studies pursued, and text books used; and certain observations on the barometer and thermometer form a part of them. They apportion to these institutions their respective shares of the literature fund, and make a full report of their doings to the legislature. They have also the power of conferring honorary degrees, though they have used it sparingly. —The British colonies have several so called universities, but they have no better claim to the title than those of the United States; in all of them, the faculty of arts is the prominent faculty, and the others, if any exist, are only of secondary importance. The Spanish-American states, both in North and South America, have universities modelled after those of Salamanca and Seville; but the teaching in most of them is not of a high order. In Brazil, the present emperor has exerted himself to improve and elevate the character of university education, calling eminent scholars from abroad to occupy the principal chairs, and introducing the latest discoveries in physical science. In Asia, the nearest approach to the university is found in China. (See CHINA, and EDUCATION.) In Persia and Hindostan there are relics of the former intellectual culture of those countries, in the now neglected universities or schools of high art.—See Du Boulay, *Historia Universitatis Parisiensis;* Anthony à Wood, "History and Antiquities of the University of Oxford;" T. Fuller, "History of the University of Cambridge," &c.; H. Malden, "Origin of Universities and Academic Degrees" (12mo., London, 1835); T. Fritz, *Esquisse d'un système complet d'instruction*, &c. (3 vols. 8vo., Strasbourg, 1840–'43); De Viriville, *Histoire des universités en France* (Paris, 1847); Sir W. Hamilton, "Discussions in Philosophy" (8vo., New York, 1853); Von Raumer, "History of German Universities," translated into English by Henry Barnard (Hartford, 1859); and E. T. Rogers, "Education in Oxford" (London, 1861).

UNTERWALDEN, a canton situated near the centre of Switzerland, bounded N. by the lake of Lucerne, E. by the canton of Uri, S. by Bern, and W. and N. W. by Lucerne; area, 298 sq. m.; pop. in 1860, 24,810. It is divided into Upper and Lower Unterwalden (Unterwalden Obwalden and Unterwalden Nidwalden), the capital of the former being Sarnen, and that of the latter Stanz. A great deal of the surface is occupied by mountains, which traverse the country in different directions, and attain heights ranging between 3,000 and 10,000 feet above the level of the sea. The remainder consists of 4 principal valleys, which have a general slope toward the lake on the N. frontier, into which the chief rivers, the Melch and the Aa, discharge nearly all the drainage of the canton. There are several small lakes, and about ¼ of the area of Lake Lucerne belongs to Unterwalden. The geological formation is chalk, and the canton is remarkable for a great number of caverns. Little of the land is level enough for agricultural purposes, but the pastures are excellent, and the cattle fed upon them constitute the wealth of the country. There are extensive tracts of forests. Apples, pears, and chestnuts are raised in great quantities in the valleys, but the vine does not succeed well even in the most sheltered spots.—The inhabitants speak German, are nearly all Roman Catholics, and very few foreigners are found among them. They are exceedingly simple in their habits. Every male inhabitant over 20 years of age is entitled to a vote in appointing the principal local officers.

UPAS TREE, an urtical exogen of the natural order of *artocarpaceæ*, which comprises both trees and shrubs abounding in milky juices, which in some species is nutritious and wholesome, but in a few is of extreme virulence. The artocarpads are scarcely different from the urticals except in their lactiferous properties. In the genus *antiaris*, to which belongs the upas tree, the flowers are monœcious, both barren and fertile being placed in pairs side by side in the axils of the leaves, the former consisting of a 3 or 4-divided calyx, and several of them collected in a hairy involucre with fleshy involute divisions, the latter singly situated, and having a simple germen enclosed in a calyx of several divisions and surmounted by a long 2-parted style. The *bohun upas* (signifying poison tree) of the Malays, the *ipo* of Celebes and the Philippines, and *antiar* of the Javanese, is the *antiaris toxicaria* of Leschenault. It is a lofty tree, with a beautiful slender stem, which overtops the neighboring plants. It is perfectly cylindrical, rising 60 to 80 feet without a branch, bears an elegant hemispherical crown, and is usually entwined with many climbers around its trunk. Its poisonous qualities are attributed to a peculiar alkaloid resident in the juice, which when freshly drawn from the tree is a bitter gum resin, of a light hue if from the young branches, and dark yellow from the older stem, but both turn black on drying. Its venomous properties can be preserved for an indefinite time if it is excluded from the air; and they so pervade the entire tree that linen spun from its tough fibres is acrid enough to produce painful itching if insufficiently prepared.—Extraordinary fables, strengthened by the narrative of Foersch, a surgeon in the Dutch East India company's service in 1774, attributed to this tree a most contagious effluvium, making the atmosphere around fatal to animal and vegetable life, and rendering the valley in which it grew a scene of desolation. When visited by Messrs. Deschamps and Leschenault, the tree was found to flourish only where vegetation was most luxuriant, the poisoned and desolate valley being situated in another part of the island, and consisting of a volcanic basin filled at bottom with carbonic acid gas. These botanists experienced no unpleasant sensations from being in its vicinity for the purpose of studying its botanical characters or investigating its structure.—There are several species of *antiaris*, of which the long-leaved (*A. macrophylla*) is found on the N. coast of New Holland, and others, whose milky juices are inert, in the tropics.

UPHAM, Charles Wentworth, an American clergyman and author, born in St. John, New Brunswick, May 4, 1802. He was graduated at Harvard college in 1821, and in 1824 completed a course of theological study at the Cambridge divinity school. The same year he was settled as colleague pastor with the Rev. John Prince of the first church in Salem. In Dec. 1844, he resigned and quitted the ministry. He next edited the "Christian Register" for a year, spent another year in visiting the counties and towns of the state as lecturer for the Massachusetts board of education, and was mayor of the city of Salem for a year. He was a member of the 33d congress (1854–'5) from the 6th district of Massachusetts, of the Massachusetts house of representatives in 1849, 1859, and 1860, and of the state senate in 1850, 1851, and 1858, and presided over that body in the last mentioned year. Mr. Upham has been a frequent contributor to the "North American Review," "Christian Examiner," "Hunt's Merchants' Magazine," Herring and Longacre's "National Portrait Gallery," and other periodicals and reviews, and, beside several occasional orations, pamphlets, &c., has published the following books: "Letters on the Logos" (Boston, 1828); "Lectures on Witchcraft, comprising a History of the Salem Delusion, 1692" (Boston, 1831); "Life of Sir Henry Vane" (in Sparks's "American Biography," Boston, 1835); "Prophecy as an Evidence of Christianity" (Boston, 1835); and "Life, Explorations, and Public Services of John Charles Fremont" (Boston, 1856).

UPHAM, Thomas Cogswell, D.D., an American author, born in Deerfield, N. H., Jan. 30, 1799. He was graduated at Dartmouth college in 1818, immediately entered the theological seminary at Andover, and in 1821 became Prof. Stuart's assistant as teacher of the Hebrew language. While thus engaged he prepared a translation of Jahn's "Biblical Archæology," which has passed through numerous editions both in this country and in England. In July, 1823, he was settled as colleague pastor of the Congregational church in Rochester, N. H.; and since 1825 he has been professor of mental and moral philosophy in Bowdoin college. In 1852 he visited Europe, the Holy Land, and Egypt. Among his works are: "Ratio Disciplinæ, or the Constitution of Congregational Churches" (Portland, 1829); "Elements of Mental Philosophy" (2 vols. 12mo., Portland, 1839), much on the same principles with Dugald Stewart and Reid; and "Philosophical and Practical Treatise on the Will" (12mo., New York, 1850). He has also written a series of treatises and memoirs on religious experience, differing in some respects from any other works of modern times on these subjects, and approximating in sentiment to the writings of Tauler, Gerson, and other mystics of the 14th, 15th, and 16th centuries. Their object is "to show that man, on acknowledged and obvious principles of philosophy and religion, can gradually but surely rise above the propensities and sins of a perverted selfhood, and not only be brought into harmony with himself in his own interior and subjective nature, but into relations of perfect peace and union with God himself and with all that is right and good in the universe." The titles of these treatises are: "Principles of the Interior or Hidden Life" (12mo., New York, 1848); "Life of Faith" (1848); "Treatise on Divine Union" (Boston, 1851); "Religious Maxims" (Philadelphia, 1854); "Life of Madame Catharine Adorna" (Boston, 1856); and "Life and Religious Opinions of Madame Guyon, together with some account of the Personal History and Religious Experience of Archbishop Fénélon" (2 vols. 12mo., New York, 1856). Beside these, he has written "Manual of Peace" (8vo., New York, 1836); "Outlines of Imperfect and Disordered Mental Action" (18mo., New York, 1840); "American Cottage Life, a Series of Poems" (16mo., Portland, 1852); "Letters, Æsthetic, Social, and Moral, written from Europe, Egypt, and Palestine" (8vo., Philadelphia, 1857); and an essay, in a volume with essays by other authors on the same subject, on a congress of nations (8vo., Boston, 1840).

UPOLU. See Navigators' Islands.

UPSAL, or Upsala, a *lan* or district of Sweden, province of Svealand, bounded N. by the gulf of Bothnia, E. by Stockholm, S. by Lake Mælar, separating it from Södermanland, and

W. by Westeras and Gefleborg; area, 2,095 sq. m.; pop. in 1858, 91,377. The sea coast extends about 20 m., and has several small indentations and the large bay of Loftsa. The principal river is the Dal, on the confines of Gefleborg, and there are numerous lakes. The surface consists of undulating plains; the soil is fertile in the S., and the scenery very beautiful, but in the N. a great deal of it is barren, and the country has a bleak appearance. Iron ore is abundant, and is extensively worked, the metal produced, especially that of Danemora, being of very superior quality. Sufficient grain is raised for the consumption of the population, and considerable quantities of cattle are exported.—UPSAL, the capital, is situated on the Fyriss or Sala, near its junction with one of the N. creeks of Lake Mælar, 39 m. N. N. W. from Stockholm; pop. 5,000. It stands in an extensive undulating plain about 300 feet above the level of the sea, and the river is crossed by two stone bridges. There is a large square in the centre of the town, and the streets are broad and well laid out. The cathedral, built between 1258 and 1435, is one of the finest Gothic buildings of N. Europe. It is of brick, and contains many interesting monuments, among others those of Gustavus I. and Linnæus. In former times the kings of Sweden were crowned here. The university of Upsal, founded in 1476, has faculties of law, philosophy, theology, and medicine, and is governed by a chancellor, assisted by 31 professors, and attended by nearly 1,500 students. It has a library containing about 100,000 volumes and some rare MSS., a very large collection of interesting objects of natural history, a collection of coins, a chemical laboratory, and an observatory. The society of sciences was established in 1719, and has published several valuable volumes of "Transactions." The palace of Gustavus is in a ruinous condition, but a part of it is occupied by the governor; and the house in which Linnæus lived is still standing. Upsal is the see of an archbishop, the residence of a governor, and the seat of several courts. The "Mora stones," at which the Swedes elected their kings between 1140 and 1520, lie about 6 m. S. E. from Upsal.

UPSHUR, a N. E. co. of Texas, bounded N. by Big Cypress bayou and S. by Sabine river; area, 950 sq. m.; pop. in 1860, 10,645, of whom 3,794 were slaves. The surface is nearly level and well timbered, and the soil fertile. The productions in 1850 were 90,495 bushels of Indian corn, 26,786 lbs. of butter, and 678 bales of cotton. There were 131 pupils attending public schools. Capital, Gilmer.

UPSHUR, ABEL PARKER, an American jurist and statesman, born in Northampton co., Va., accidentally killed at Washington, D. C., Feb. 28, 1844. He was graduated at Nassau Hall, Princeton, N. J., in 1807, studied law in the office of William Wirt at Richmond, Va., was admitted to the bar in 1810, and practised his profession in Richmond till 1824, when he removed to his patrimonial residence in Northampton co. In 1826 he was appointed a judge in the general court of Virginia, in 1829 was a member of the convention to revise the constitution of the state, and after the reorganization of the judicial system under the new constitution was again elected a judge in the general court, and continued to fill that position till he was called in 1841 by President Tyler to the post of secretary of the navy. On the resignation of Mr. Webster in 1843 he was transferred to the office of secretary of state, which he filled till his death, caused by the explosion of a monster cannon on board the U. S. steamer Princeton, which he was visiting in company with the president and the other members of the cabinet. Judge Upshur published a number of essays, reviews, addresses, &c., and two more considerable works, viz.: a review of Story on the constitution, and "An Inquiry into the Nature and Character of our Federal Government."

UPSON, a W. co. of Georgia, bounded S. W. by Flint river and intersected by Potato creek; area, 384 sq. m.; pop. in 1860, 9,910, of whom 4,888 were slaves. The surface is hilly and the soil generally fertile. The productions in 1850 were 343,017 bushels of Indian corn, 68,709 of sweet potatoes, and 7,443 bales of cotton. There were 3 cotton factories, 4 grist mills, 4 saw mills, 21 churches, and 650 pupils attending public schools. Capital, Thomaston.

URAL, formerly YAIK, a river of Russia, forming the boundary between Europe and Asia. It takes its rise in the district of Troitzk, in the Asiatic portion of the government of Orenburg, in the S. part of the Ural mountains. Its source is about 1,720 feet above the sea, and it flows at first S. past Verkho Uralsk, Magnitnaya, and Kizilsk, bends W. near Orsk, passes Orenburg, and turning S. E. flows past Uralsk, thence S., washing the base of the forts Tchegannoy, Kalmykova, and Saraitchik, and discharges its waters into the Caspian sea by several mouths, near Guriev, about lat. 47° N. Its length is variously estimated at from 1,500 to 1,800 m., and it drains a territory of 83,200 sq. m. Its principal affluents are, on the right, the Kizil, Tanalik, Sakmara, and Bolshoy Tchegan; and on the left, the Suyunduk, Or, Ilek, Ulva, and Grashi. In its upper portion the river is obstructed by rapids, and flows through a mountainous country; lower down, it passes through wide steppes or saline plains, one of which lying between this river and the Volga is called the Uralian steppe. Toward winter the river near its mouth abounds with fish. The navigation of the Ural is of very little importance. The inhabitants upon its banks are mostly Cossacks. A line of forts has been erected along its shores as a defence against the Bashkirs and Kirgheez.

URAL MOUNTAINS, the chain of mountains forming the N. E. boundary of Europe, and separating European Russia from Siberia. Of very moderate height and breadth, the chain would appear insignificant but for the contrast it presents to the great regions of plains that spread from its W. flank over central Russia and from its E. side into Siberia. Its course is nearly due N. and S. over an extent, as usually estimated, of 19° or 20°, with a breadth of about 40 miles. On the S. it commences on the right bank of the Ural river at the Kirgheez steppe, in about lat. 51° N.; but high lands may be traced still further S. into the region lying between the lake of Aral and the Caspian sea. On the N. its termination is at the Kara sea, or Karskaya gulf of the Arctic ocean, though its continuation is marked in the rocky hills on the W. side of Nova Zembla. The highest summit of this portion of the range, named Glassovskoy, is about 2,500 feet above the sea. The average elevation of the Ural mountains is probably less than 2,000 feet above the level of the sea, and its highest summits do not exceed 6,000 feet. Much of the range blends so gradually into the plains at its sides that it has little of the mountainous character, and is crossed by easy roads, as that by which Ekaterinburg is reached from Russia. The highest summit is said to be Deneshkin Kamen, to the N. of lat. 60°. Other principal summits are Konskakofskoy Kamen, 5,397 ft. high; Tremel or Iremel, 5,075 ft.; Constantinov Kamen, 5,000 ft.; and Taganai, 3,592 ft. It is only in the extreme northern part that the mountains remain covered with snow during the summer. In general, the chain is clothed with forests of the gigantic *pinus cembra*, above which are often uplifted rugged ledges of rock of most picturesque forms, and frequently overgrown with pæonies, roses, and geraniums. The rocks of which these mountains are composed, as described by Sir Roderick Murchison, resemble those of the Appalachian mountains. The lower groups are silurian strata metamorphosed into crystalline rocks, which for the most part are talcose schists, quartzites, and limestones. To these succeed the upper silurian, devonian, and carboniferous, the strata of which are also more or less altered, though still retaining traces of their characteristic fossils. A marked contrast is observed in the appearance of these rocks on the European and Asiatic slopes. On the former the strata are indeed contorted, fractured, and partially changed; while in the centre, as on the eastern slopes, the masses consist everywhere either of highly altered and crystalline silurian strata, or of the eruptive rocks which penetrate them. It is in these formations, especially where the talcose and chloritic schists are traversed by veinstones of quartz or cut by dikes of igneous rocks, that gold is found. In the debris from these are situated the gold washings, which furnish the chief portion of this metal and of platinum to the Russian government. (See EKATERINBURG, GOLD, and PLATINUM.) There are also important mines of iron and copper; and diamonds, emeralds, and various other precious stones are found in the same region.

URANIA, one of the nine Muses, daughter of Zeus by Mnemosyne. She was regarded as the muse of astronomy, and was usually represented with a little staff pointing at a celestial globe.

URANIUM, a metal, the protoxide of which, supposed to be the metal itself, was discovered in 1789 by Klaproth in the mineral pitchblende, and was named by him after the planet Uranus, which was discovered in 1781. The metal itself was not really separated until M. Peligot obtained it in 1840 by decomposing its chloride by means of potassium or sodium. Thus produced, it is partly in the form of a black powder, and in part composed of silvery laminæ which can be filed and are somewhat ductile. The metal dissolves in dilute acids, setting free hydrogen gas. In the air it undergoes no change at common temperatures; but when moderately heated it takes fire and burns with a remarkably white and shining light. So little heat is evolved, that a piece of paper upon which the burning metal is placed is not ignited. The product of its combustion is a deep green oxide. Uranium is represented by the symbol U, and its chemical equivalent is 60. In its chemical relations it resembles iron and manganese. It forms several compounds with oxygen, one of which, the black oxide ($2UO, U_2O_3$), forms about 80 per cent. of the mineral pitchblende. The sesquioxide (U_2O_3) performs the part both of an acid and a base, and is the oxide of what are known as the yellow salts of uranium. The compounds of uranium are employed chiefly in giving yellowish hues to glass and porcelain. The peculiar yellow tint with greenish or opaline reflections seen in Bohemian glass is derived from compounds of uranium. This uranium glass is remarkable for exhibiting with great distinctness the phenomenon of "epipolic dispersion of light," described a few years ago by Prof. Stokes and Sir David Brewster. These compounds are also of great value in porcelain painting, mineral pitchblende being used to a considerable extent at Joachimsthal in Bohemia, where it is converted into uranate of soda for this purpose. It produces an orange color in the enamelling fire, and a fine black in the furnace in which the porcelain is baked. The uranate of potash is of a fine orange color, and has been proposed as a paint. It is found accompanying various ores of silver and lead in several of the mining districts of Bohemia, Hungary, and Saxony. Uranium is found in a number of other minerals in combination with lime as a sulphate or carbonate; also with copper and lime; and in the hydrated phosphate of uranium and lime, known as uranite, of which the oxide forms 62.7 per cent. The lime is sometimes replaced by oxide of copper, when the mineral, in beautiful green crystals, is known as chalcolite or copper uranite. Fine specimens of these are found near Redruth and elsewhere in Cornwall.

URANUS, in Greek mythology. See CŒLUS.

URANUS, THE PLANET. See ASTRONOMY.

URBAN, the name of 8 popes, of whom the following are the most important. I. URBAN II. (ODO OF LAGNY), born in Châtillon-sur-Marne, died July 29, 1099. He was archdeacon of Rheims, and afterward provost of Cluny. Gregory VII. made him bishop of Ostia, and sent him in 1084 to the emperor Henry IV. to settle the controversy respecting investitures. He was elected the successor of Victor III. in 1088, at Terracina, as the see of Rome was occupied by the antipope Clement III. Urban was at once recognized by all the Christian princes except Henry IV., who, with all the bishops of Germany but 5, sustained Clement, and the king of England, who for some time remained neutral. The antipope had to flee from Rome in 1089, and a council convoked by Urban excommunicated Clement, the emperor, and their adherents. In 1091 Clement returned, under the protection of an imperial army, and Urban fled for protection to Count Roger of Apulia; but in 1093 he once more took possession of Rome, although one of the forts remained until his death in the hands of the antipope. By his order a council at Autun in 1094 excommunicated Philip I. of France for having repudiated his wife Bertha and married Bertrada. When Conrad, a son of Henry IV., declared himself against his father, Urban recognized him as emperor. At a synod in Piacenza in 1094, he condemned the doctrine of Berengarius on the eucharist. At the council of Clermont (1095) he called on the Christian nations to deliver the holy sepulchre at Jerusalem from the Mussulmans, and thus gave an impulse to the crusades. At the council of Bari in 1098, he made a fruitless attempt to effect a union of the Greek and Latin churches. Urban was one of the most influential popes of the middle ages. He declared the election of a pope independent of the assent of the Roman emperor, vigorously enforced the law of celibacy, and forbade bishops and priests to accept ecclesiastical offices from the hands of laymen. II. URBAN V. (GUILLAUME GRIMOARD), born in the diocese of Mende, died Nov. 18, 1870. He was a member of the Benedictine order, abbot of Auxerre in 1358 and of Marseilles in 1858, and papal legate in Naples and Sicily, and was elected in 1862, at Avignon, successor of Innocent VI. He went in 1867 to Rome, but in 1870 returned to Avignon. In 1869 the Greek emperor John Palæologus himself visited Rome, abjured the peculiar tenets of the Greek church, and acknowledged the supremacy of the pope. In 1870 Urban sent missionaries to the Tartars and an embassy to Georgia, as the churches of Georgia had joined the Greek church. He was the first pope who blessed a golden rose for princes (he presented it to the queen of Naples), and the last who resided in Avignon. He was a patron of scholars, and praised by his contemporaries as entirely free from nepotism. III. URBAN VI. (BARTOLOMMEO DI PRIGNANO), born in Naples, died in Rome in 1389. Before his accession to the papal see he was archbishop of Bari. He was elected successor of Gregory XI. in 1378 by the cardinals assembled at Rome; but the cardinals who were residents of Avignon did not recognize him, and in union with some of the Roman cardinals, who declared his election a compulsory one, elected Count Robert of Geneva pope under the name of Clement VII. Thus began what is known as the great schism in the Roman Catholic church. Clement was recognized by France, Scotland, Spain, Savoy, Lorraine, and Naples, and he resided in Avignon; Urban was recognized by England, the Netherlands, Scandinavia, Italy, Hungary, Bohemia, Poland, and the German emperor Charles IV. The two popes, with the aid of their allies, carried on war against each other until the death of Urban. When Queen Joanna of Naples, who had supported Urban with an army, abandoned his cause, the pope anointed Charles of Durazzo king of Naples; but soon he fell out with the latter also, and excommunicated him. Urban was besieged by Charles in Nocera, and fled in 1386 to Genoa and Lucca, but in 1388 returned to Rome. He ordered the year of jubilee to be celebrated every 33 years, instead of every 50 as before, and appointed the first for the year 1390. IV. URBAN VIII. (MAFFEO BARBERINI), born in Florence in 1568, died in Rome, July 29, 1644. Under the pontificate of Gregory XIV. he was governor of Fano, and under Clement VIII. papal prothonotary; in 1604 he was appointed archbishop of Nazareth (*in partibus infidelium*) and ambassador to Paris, in 1605 cardinal presbyter, and in 1608 archbishop of Spoleto. He was elected successor of Gregory XV., Aug. 6, 1623. He was a patron of sciences and arts, but left the government mostly to his relations, who favored France, and monopolized the most important offices. Through one of his relatives he was involved in a war with the duke of Parma in 1642, which he was obliged to conclude in 1644 by an unfavorable peace. He bestowed upon the cardinals, the three clerical electors of Germany (the archbishops of Mentz, Cologne, and Treves), and the grand master of the knights of Malta, the title most eminent (*eminentissimus*), which led to a long controversy with Venice. He condemned the doctrine of Jansenius and the system of Galileo, established the college of the propaganda, issued a revised edition of the Roman breviary, gave to the bull *In Cœna Domini* its present form, and forbade priests the use of snuff in church under pain of excommunication. A volume of his poems procured him membership in the *Accademia dei Gelati* at Bologna.

URBANA, a post village and township, the capital of Champaign co., Ohio, at the crossing of the Columbus and Indianapolis and the Sandusky, Dayton, and Cincinnati railroads, 46 m. W. from Columbus and 98 N. W. from Cincinnati; pop. about 4,500. It is finely situated and well built, and has several manufactories, 2 newspaper offices, 2 banks, and a large union school. It is the seat of Urbana university, founded in 1850 by the New Jerusalem church, and having in 1861 8 professors and teachers and 21 students in the collegiate department; and of the Urbana collegiate institute, a female seminary under the charge of the United Presbyterian church, having a large and elegant edifice with extensive grounds and 6 teachers.

URBINO (anc. *Urbinum Hortense*), a fortified city of Italy, capital of the province of Urbino e Pesaro, situated on a hill, 20 m. S. W. from Pesaro, and about the same distance from the Adriatic; pop. about 7,000. It is a walled town, and has a fine government house, formerly the ducal palace, containing a collection of sculptures and antiquities; the Palazzo Albani, a cathedral, and several churches and convents. It is the see of an archbishop, and has a university, a theological seminary, and an academy of sciences and literature. It has a large manufactory of pins, and 4 annual fairs. The university was founded in 1671, and in 1860 had 20 professors and 72 students.—Urbino is a city of considerable antiquity. Pliny and Tacitus both mention it, the latter as the place where Fabius Valens was put to death in A. D. 69. Numerous inscriptions still extant prove its importance at that period. In A. D. 538 it was besieged and taken by Belisarius. After that event it continued to be a place of note, and during the middle ages was the seat of a race of independent dukes. Raphael was born here, and his house is still preserved.

URBINO E PESARO, a province of the Marches, in the kingdom of Italy, formerly a legation of the Papal States, bounded N. by Forli, N. E. by the Adriatic, S. by Ancona, Macerata, and Perugia, and W. by Perugia and the Tuscan district of Arezzo; area, 1,358 sq. m.; pop. 257,751, about equally divided between the districts of Pesaro and Urbino. The surface is mountainous. The soil, especially in the valleys, is fertile, producing various sorts of grain, flax, hemp, the olive, and the vine. The principal rivers are the Metauro, Cesano, Foglia, and Marecchia. Horned cattle, sheep, swine, bees, and silkworms are extensively reared. The province is formed from the ancient duchy of Urbino, and occupies part of the old territory of Umbria. Capital, Urbino.

URCHIN FISH. See Sea Porcupine.

URE, Andrew, a Scottish chemist, born in Glasgow in 1778, died in London, Jan. 2, 1857. He was educated at the universities of Glasgow and Edinburgh, and, having taken the degree of M.D., was in 1802 appointed professor of chemistry and natural philosophy in the Andersonian institution at Glasgow. Upon the establishment of the astronomical observatory in Glasgow he was placed in charge of it, and took up his residence in the building. In 1818 appeared his first important work, a "Systematic Table of Materia Medica," with a dissertation on the action of medicines, followed in 1818 by a remarkable paper entitled "New Experimental Researches on some of the leading Doctrines of Caloric," which was subsequently published in the "Philosophical Transactions." Within the next few years he published a "Dictionary of Chemistry" (1821), a translation of "Berthollet on Dyeing" (1822), a "System of Geology" (1829), and numerous papers on chemical subjects. In 1830 he removed to London, and was appointed analytical chemist to the board of customs, an occupation which suggested and supplied materials for his succeeding works. These comprise "The Philosophy of Manufactures" (1835), "The Cotton Manufacture of Great Britain compared with that of other countries" (1836), and his well known "Dictionary of Arts, Manufactures, and Mines" (1839), which has passed through several editions in America and England, the last of which, enlarged and edited by Robert Hunt, was published in 1860 (3 vols. 8vo.).

UREA. See Urine.

UREDO, a genus of entophytous fungi resembling heaps of colored dust, and escaping from the tissues of plants by the bursting of their epidermis. Their origin was for a long time a matter of much uncertainty. The subject has been lately studied with care by Tulasne, who proved them in many instances to be rudimentary forms of other fungi and imperfectly developed conditions. The uredos are very often injurious in agriculture, species being known to the farmers as bunt, smut, burnt ear, &c., when attacking the seeds of the cereals, or rust, red rag, red gum, &c., when found on the stems and leaves of grain and grasses. The subject is treated at considerable length by Burnett in his "Outlines of Botany" (London, 1835); by Prof. Henslow in the "Journal of the Royal Agricultural Society" (vol. ii., London, 1841); and by Tulasne in *Annales des sciences naturelles* (3d series, Paris, 1854.) A treatise by A. C. Corda on "The Brand in Cereals," with figures of the species, has been translated for the "American Journal of Agriculture and Science," by E. Goodrich Smith, and separately published (Albany, N. Y., 1847). The several species of uredo in America, in common with like cryptogamic plants of low development of structure, are identical in many instances with those abroad.

URFÉ, Honoré d', a French author, born in Marseilles in 1567, died in Villefranche in 1625. He was descended from a noble family, and after leaving college entered at the head of a company of 50 men the army of Henry IV. On his return he found Diane de Château-Moraud, a rich and beautiful heiress of his district, to whom he had been attached in his youth, married to his elder brother Anne d'Urfé. This couple, after living together 20 years, were divorced by mutual consent, and in order to retain the property in the family Honoré sought and obtained the hand of Diane. The lady however was so passionately fond of hunting, that she kept a large number of dogs, whom she allowed in her sleeping apartments. The insupportable smell caused by these animals led him to retire to a small estate near Nice in Piedmont, where he composed *L'Astrée*. The first part appeared in 1610, the second in 1612, and two more in 1618; and after the death of D'Urfé a conclusion compiled from his manuscripts was added by his secretary Baro. The work was imitated by numerous authors, and from it a great number of subjects for dramas and paintings were taken. Beside this, D'Urfé wrote *La Syreine, avec d'autres pièces* (1611 and 1618); *Épitres morales* (1598, 1603, and 1620); and *La sylvanire, fable bocagère*.

URFEY, Thomas D'. See D'Urfey.

URI, a canton of Switzerland, bounded N. by the canton of Schwyz, E. and S. E. by Glarus and Grisons, S. by Ticino, and W. by Valais, Bern, and Unterwalden; area, 418 sq. m.; pop. in 1860, 14,761. It is divided into the districts of Uri and Urseren, and Altorf is the capital. The surface is exceedingly mountainous, many of the summits rising to an elevation of 8,000 feet above the sea, and several exceeding 10,000 feet. The best known, though by no means the most elevated summit, is that of St. Gothard, and the highest points are Gallenstock, Sustenhorn, Scheerhorn, Spannorter, Windgelle, Bristenstock, Urirothstock, and Mutthorn. The only practicable outlets from the canton are by the road to Italy, which leads over the pass of St. Gothard, 6,700 feet above the level of the sea, and by the lake of Lucerne. Some of the head streams of both the Rhine and Rhône have their rise in Uri; but the principal river is the Reuss, which rises on the S. side of Mt. St. Gothard, receives the greater part of the drainage of the canton, and flows into the lake of Lucerne after a N. course of 30 m., during which it descends 4,500 feet. The most extensive valley lies upon the banks of this stream. It is narrow and rugged about the head, but becomes wider and level toward its lower extremity. The climate is cold, and strong winds blow from the mountains with great violence. Some grain, rape, hemp. potatoes, and vegetables are cultivated in the lower grounds, and fruit, walnuts, and chestnuts are grown. The inhabitants speak German, are simple in their habits, and almost all Roman Catholics; few foreigners are found among them. The government is a pure democracy, and every male inhabitant over 20 years of age is entitled to vote for the principal officers.

URIC ACID. See Urine.

URIM AND THUMMIM ("light and truth"), two Hebrew words, the application of which is disputed. According to one opinion, they denote the four rows of brilliant precious stones in the breastplate of the high priest, upon each of which was engraved the name of one of the sons of Jacob. When an appeal was made to God by the high priest in difficult cases, the divine answer was manifested in some way by means of this breastplate, or, in the opinion of some commentators, by an audible voice speaking to the priest arrayed in full pontificals. According to other critics, the Urim and Thummim were two images personifying revelation and truth placed between the folds of the breastplate. The first time they are mentioned in the Bible, they are referred to as things already familiar to the Israelites: "And thou shalt put in the breastplate of judgment the Urim and the Thummim." (Exod. xxviii. 30.) It is unknown when this oracular method of consulting God ceased. There is no instance of it in Scripture during the time of the first temple, and it certainly was not practised during that of the second. There is a saying among the Jews that God spoke to his people during the tabernacle by the Urim and Thummim, during the first temple by the prophets, and during the second by the Bath-Kol.

URINE, the excrementitious fluid secreted by the kidneys, by means of a structure described in the article Kidney, transmitted slowly but continuously by the ureters to the bladder, and there retained until the distention of the organ requires its evacuation. It is secreted from arterial blood, and expelled by the agency of the abdominal muscles assisted by the contraction of the walls of the bladder, the sphincter at its opening being relaxed during the act of micturition. Its quantity varies with the amount of water in the blood, which it regulates, also removing from the body solid matters in proportion to the waste of the tissues and the surplus of azotized material in the system. The importance of this secretion is shown by the injurious effects arising from the retention of its elements in the blood, in *uræmia*, as it has been called. On account of the ease with which this secretion may be collected, both in health and disease, and the facility with which its ingredients may be separated by chemistry, its nature, purposes, and alterations are very well known. Fresh, healthy human urine should be perfectly transparent, amber yellow, with a peculiar but not disagreeable odor, and a bitterish saline taste; it contains a very small amount of pavement-epithelium cells and mucus-corpuscles, and has a well marked acid reaction; after a time it grows turbid, with a mucous sediment, unpleasant odor, and alkaline reaction from the formation of carbonate of ammonia and precipitation of the earthy carbonates; if turbid when first passed, it may be considered abnormal. The average amount, according to Prout, passed in 24 hours by a person who drinks no more than the wants of the system require, is about 30 oz. in summer and 40 oz. in winter. It is well known that the urinary and cutaneous secretions are complementary of each other, in regard to the quantity of fluid eliminated, one being increased while the other is diminished; cold, by checking the exhalation from the skin, increases the amount of urine secreted. The average specific gravity, taking the year round, according to the same authority, is about 1.020, and according to Simon 1.012. From the varying amount of azotized food and watery fluids habitually ingested, the proportion of solid matter in the urine may vary from 20 to 70 in 1,000 parts; taking 100 parts of solid residue, the principal components are, according to different chemists, as follows:

Urea	33.80 to 49.68
Uric acid	1.40 to 1.60
Extractive matter, ammonia salts, and chloride of sodium	29.00 to 42.60
Alkaline sulphates	10.18 to 11.58
Alkaline phosphates	4.57 to 6.88
Phosphates of lime and magnesia	1.50 to 1.97

—The most important of the organic constituents of the urine is urea; this is due to the metamorphosis of the azotized components of the tissues (especially the muscular) and of the blood, and gives to the secretion its characteristic properties; the amount excreted in 24 hours in a child of 8 years is about 208 grains, in the adult female 295, in the adult male 433, and in the old man of 85 years 125 grains, the great proportion in children and the small in the aged depending respectively on the rapidity and on the slowness of the interstitial changes; it is usually increased in febrile diseases, where waste is rapid and supply small. Uric acid is the next most important of the organic products of the urine; its formation is probably anterior to that of urea; it is increased by azotized food, and diminished or converted into urea by exercise. Dr. Bence Jones has shown that there is no relation between the acidity of the urine and the absolute amount of uric acid which it may contain; this acid is sometimes in excess in febrile diseases. The acidity of the secretion in the healthy state depends on the presence of the acid phosphate of soda, though in disease free organic acids are present; it increases and diminishes inversely with the acidity of the stomach. The extractive matters, except such as are convertible into urea, are rich in carbon and poor in nitrogen. The alkaline phosphates are most abundant when, from disease or excessive use of the brain, there is a too great disintegration of the nervous tissue. The earthy phosphates, though in small proportion, are very important in reference to the precipitates they form, for which see Calculi, Gout, and Gravel. Tea and coffee diminish the amount of urea and phosphoric acid in the urine, by retarding the activity of the metamorphic processes; the waste under their stimulus being less, the demand for food is less, an important fact in a dietetic and therapeutic point of view; alcohol does the same, but by obstructing the oxidation of the excrementitious matters, and causing their retention in the blood; tobacco, also, retards the metamorphosis of the tissues, and upon this doubtless depends the instinctive craving for this article when once employed, enabling a man the better to withstand a short allowance of food. Alkalies and their carbonates accelerate metamorphosis, and thus increase the solids of the urine; diuretic medicines, which cause a larger amount of fluid to be passed off by the kidneys, do not necessarily increase, but often actually diminish, the quantity of solids thus excreted. Urine, or a fluid presenting its essential characters, may pass off by the gastric and intestinal mucous membrane, by the lachrymal, salivary, and mammary glands, by the ears, nose, skin, and even by serous membranes; these metastases are especially frequent in hysteria.—Space will not permit here any description of the diseases of the human urine, a subject of so great interest to the physician that many volumes have been devoted to it; some of the most important of them have been noticed in previous articles. When the secretion is very abundant, it may constitute either the symptom diuresis, or the disease diabetes; when painful, it is called dysuria; when suppressed, ischuria; and when drop by drop, with pain, burning, and spasm, strangury; in Bright's disease it is albuminous, whence this affection has been named albuminuria; in one form of diabetes, it is highly charged with sugar; when the secretion cannot be retained, the symptom is called incontinence; very frequently the cylindrical linings and the fibrinous moulds of the uriniferous tubes are detected in the fluid. Man being an omnivorous feeder, his urine differs considerably from that of purely carnivorous and purely herbivorous animals; even in him it varies much according to peculiarities of diet. In carnivora it is generally acid when discharged, becoming rapidly alkaline and ammoniacal; in herbivora it is alkaline when passed, and contains a large quantity of alkaline and earthy carbonates; in carnivora it contains about 7 per cent. of urea, is clear, bright yellow, and of a specific gravity of 1.059 to 1.076; in herbivora it is turbid when passed, from the alkaline carbonates, of somewhat lower specific gravity than in the preceding, with about 1 per cent. of urea, and hippuric acid ½ per cent. (in the ox) to 1 per cent. (in the horse). In birds the urine is a thin paste, hardening by exposure, consisting principally of urate of ammonia, that of the carnivorous families containing a considerable amount of urea. In serpents it is a white earthy mass, consisting of uric acid with potassa, soda, and ammonia; in the bullfrog, according to Dr. John Davy, its specific gravity is 1.008, and it contains urea and chloride of sodium; in a large land tortoise, according to Marchand, it was faintly acid, looking like pus, with 6.40 of urea and 17.25 of uric acid in 1,000 parts.—Beside the authors quoted above, the following may be mentioned as giving information of great value: Berzelius, Bright, Becquerel, Dumas, Liebig, Lehmann, Frerichs, Golding Bird, Bernard, Dalton, and Draper.

URQUHART, David, a British author and politician, born in Braclanwell, county of Cromarty, Scotland, in 1805. In his youth he spent several years upon the continent, and then entered the university of Oxford, where he devoted his attention chiefly to political economy and the oriental languages. In 1827 he visited Greece with Lord Cochrane, after the peace of Adrianople went to Constantinople, and in 1831 returned to England, publishing a remarkable work entitled "Observations on European Turkey," in which he attempted to prove that the Russian politics tended to the destruction of Turkey and the enfeeblement of other powers, especially of England, and that Turkey had within itself the elements of resistance and progress. Immediately afterward he made a long journey in Germany, Turkey, Persia, and other portions of Asia, with a view of studying the political and commercial influence of Russia. While in the East he published "Turkey and its Resources," and pamphlets entitled "England and Russia," "The Sultan Mahmoud," and "Mehemed Ali Pasha," which excited much attention by their asserted exposure of the designs of Russia. Returning to England, he labored constantly to impress his views both upon the king and the people, and in 1835 was made by Lord Palmerston secretary of legation to Constantinople. In consequence of differences of opinion with Lord Ponsonby, the British ambassador, he resigned and returned to England in 1836, and began a system of attacks upon Palmerston, whom he accused of a betrayal of British interests, and of Russian tendencies. During the following year he published "Spirit of the East" (London, 1838), "Exposition of the Affairs of Central Asia" (London, 1840), "Exposition of the Boundary Differences between Great Britain and the United States" (Glasgow, 1840), and other writings of temporary interest. When the oriental question threatened a breach between England and France, he went to Paris, and in the daily press constantly attacked the policy of the British minister, a course which injured him in his own country. While in Paris he published *La crise, ou la France devant les quatre puissances* (1840). Returning to England, he labored for some time ineffectually to get into parliament, but in 1847 was elected for Stafford. The political agitations which shortly afterward followed throughout Europe preventing any consideration of eastern questions, he undertook in 1848 a journey to Spain and northern Africa, and on his return published "The Pillars of Hercules, a Narrative of Travels in Spain and Morocco" (2 vols., London, 1850). In 1852 he was not reelected, but continued to labor none the less earnestly to diffuse his ideas that the English ministry had a secret understanding with Russia, and was bent upon the ruin of Turkey; and his conduct became so extravagant, that he was considered a monomaniac. His partisans are now very few, and he rarely appears in public life. His latest works are: "Progress of Russia in the West, South, and North" (1853), and "Recent Events in the East" (1854).

URQUIZA, Justo José de, ex-president of the Argentine Confederation, born in the state of Entre Rios about 1800. He is of mixed Spanish and Indian blood, and during the war which raged in La Plata attached himself to the party of Rosas, rising to the rank of general of division. In 1840 he commanded the Argentine army which Rosas sent against Uruguay, from which his friend Oribe had been driven by Rivero. The latter finally suffered a complete defeat from Urquiza on March 28, 1845, in the battle of India Muerte, and the victorious general was rewarded with the governorship of Entre Rios. When in 1851 Rosas pretended to lay down the supreme power, Urquiza took him at his word, and a war was the consequence. The latter allied himself with Brazil, Paraguay, and Uruguay, assembled an army of 30,000 men, crossed the Parana in Jan. 1852, routed the Argentine army at Monte Caseros Feb. 3, and by a *coup d'état* made himself provisional dictator of the Argentine republic. He called a new congress at Santa Fé in August, which was to take definite steps for the settlement of the country. A revolution in Buenos Ayres in the mean time was succeeded by a counter revolution, with the aid of which he began the siege of Buenos Ayres. The defence was maintained with vigor, and by the desertion of the squadron enforcing the blockade, he was at last forced to retire. In March, 1854, he was elected for 6 years president of the 13 other states composing the union; and he employed his power in an enlightened manner, reëstablishing commerce and navigation, and declaring the Parana, the Paraguay, and the Plata free to foreign powers. The war against Buenos Ayres was continued. In 1859 he mediated between the United States and the republic of Paraguay, on occasion of the La Plata naval expedition, and toward the close of that year also succeeded in bringing back the state of Buenos Ayres into the Argentine Confederation. In the following year he was succeeded in the presidency by Dr. Santiago Derqui, under whom he is now (1862) honorary commander-in-chief of the army and navy.

URSA MAJOR. See Bear, Great.

URSINUS, Fulvius, an Italian scholar, born in Rome, Dec. 2, 1529, died there, May 18, 1600. He was an illegitimate son of a commander of the order of Malta, and rose to be a canon in the church of St. John Lateran. He was librarian successively to Cardinal Rainutius and Cardinal Alexander Farnese, and received an annual pension of 200 ducats. His works are very numerous, and consist of commentaries on and editions of the ancient writers, and dissertations on antiquarian subjects.

URSINUS, Zacharias, a German theologian, born in Breslau, July 18, 1534, died in Neustadt, March 6, 1583. He was educated at Wittenberg, early gained the friendship of Melanchthon, went with him to Worms, and after studying at Paris returned to Wittenberg, where in 1558 he was rector of the Elizabeth gymnasium. On account of his views in regard to baptism and the Lord's supper, he became involved in controversies with the Lutheran divines, and was called the sacramentarian. In 1560 he resigned on account of these disputes, and went to Zürich, and thence to Heidelberg, where he became a professor in the *collegium sapientiæ*. In 1562, by order of the elector palatine, he drew up the celebrated Heidelberg catechism, which the German Calvinists afterward adopted as the exposition of their creed. Ursinus was forced to write two defences of it, one against the Lutheran divines, and the other against the representations of the princes of the empire. He was subsequently employed in various offices by the elector, which he was obliged to give up on the death of the latter in 1577, the new elector being a strong Lutheran. He then retired to Neustadt, and taught theology and logic in the gymnasium of that city. Some of his works were translated into English. The best edition is that of Heidelberg (3 vols. fol., 1612).

URSULA, a saint of the Roman Catholic church, and, according to the legend, a daughter of a Christian prince of Britain. Having been demanded in marriage by a pagan prince, and fearing by a refusal to bring ruin upon her parents and country, she seemingly consented, but obtained a delay of 3 years, and a grant of 11 triremes and 10 noble companions, each as well as herself attended by 1,000 virgins. She passed the 3 years with her virgins in nautical exercises; and when the day fixed for her marriage arrived, a sudden wind arose at their prayer, and wafted them to the mouth of the Rhine, and thence to Basel. Here they left their vessels, and made on foot a pilgrimage to Rome. On their return they fell in unexpectedly at Cologne with an army of Huns, by whom they were massacred, Ursula having refused an offer of marriage from the prince. Their corpses were buried by the people of Cologne, and a church was afterward erected in their honor, in which bones supposed to be those of Ursula and her companions are still exhibited. The first traces of this legend, which was gradually enlarged, are met with in the 9th century.

URSULINES, a monastic order in the Roman Catholic church, founded in 1537 by Angela Merici of Brescia (canonized May 24, 1807). The foundress designed it to be only a religious association or sisterhood for nursing the sick, supporting the poor, and gratuitously instructing poor girls. Every member of the association was to be permitted to remain in the bosom of her family, and the rule might be changed according to the exigency of circumstances. Soon after the death of Angela Merici the wearing of a common dress was introduced, and 30 years later the association began to spread beyond the diocese of Brescia into other parts of Italy. Gradually the members began in many places to live together in one house, to choose superiors, and to take simple vows; in this case they assumed the name of Congregate Ursulines. The order of "Ursuline nuns," which adopted the rule of St. Augustine, and took solemn vows, was first organized in 1604 by Madeleine de Ste. Beuve at Paris, and confirmed by the pope and king in 1612. In a short time this congregation of Paris counted in France 45 houses. Other French congregations were founded at Bordeaux (1617), Dijon (1619), Lyons (1620), and elsewhere. All the Ursuline convents are placed under the jurisdiction of the diocesan bishop, and their mutual coherence is so loose, that many convents do not even know to which of the numerous congregations they belong. They have not abandoned the primary object of the original association, the nursing of the sick and the poor; but they are now mainly devoted to the instruction of girls. In 1860 they had 16 houses in Italy, 410 in France, 21 in Belgium and Holland, 37 in Germany, 2 in Switzerland, 3 in Hungary and Transylvania, 1 in Greece, 7 in the British islands, 2 in Spain, 1 in Prussian Poland, 1 in Algeria, 1 in Guiana, and 17 in North America, viz.: at Morrisania, near New York; Cleveland, Toledo, Fayetteville, and Ohio City, O.; Springfield and Alton, Ill.; Columbia, S. C.; Savannah and Augusta, Ga.; New Orleans, La.; San Antonio and Galveston, Tex.; Louisville, Ky.; St. Louis, Mo.; and at Quebec and Trois Rivières, Canada.

URUGUAY, or **Banda Oriental del Uruguay**, a republic of South America, bounded N. and N. E. by Brazil, E. and S. E. by the Atlantic ocean, S. by the Rio de la Plata, and W. by the Uruguay, these two rivers separating it from the Argentine Confederation. It lies between lat. 30° 5′ and 34° 56′ S., and long. 53° 10′ and 58° 20′ W.; extreme length 350 m., breadth 320 m.; area, 72,000 sq. m.; pop. in 1852, 217,429. It is divided into 13 departments, viz., Montevideo, Guadalupe (formerly Canelones), San José, Florida, Colonia del Sacramento, Soriano, Paysandu, Salto, Tacuarembo, Cerro Largo, Maldonado, Minas, and Durazno. The chief towns are Montevideo, the capital, Maldonado, and Colonia del Santo Sacramento. To the N. of Cape Santa Maria the coast is low and sandy, but S. and W. of it and on the estuary of the Rio de la Plata it is more bold and broken, having several fine bays and harbors. A few small islands lie off the shore, the largest of which is about 2 m. in circumference. The most important streams of the interior are the Rio Negro and its numerous tributaries, and the Arapey, Daiman, Yaguaron, and Sebollati. In the E. part of the country there are two lakes, the largest of which lies partly in Brazil. In the neighborhood of these lakes a low sandy tract extends inland for about 50 m.; but the greater part of the surface consists of an elevated table land penetrated by many fertile valleys along the S. coast. The surface of this table land consists of extensive plains traversed by occasional ranges of low hills, the whole being almost destitute of trees. Potters' earth and umber are found, copper ore is procured near Cape Maria, and mines of gold and silver are said to have been formerly worked. The climate is remarkably mild and healthy, but during the winter months a good deal of rain falls in the lower part of the country. Severe frosts occasionally occur on the table land, but very little snow falls, and cattle are consequently enabled to find subsistence at all seasons. A great deal of the land is rich and fertile, but agriculture is much neglected. Wheat, maize, barley, rice, peas, beans, flax, hemp, and cotton are all raised; and the vine, peach, sugar cane, and numerous kinds of fruit trees thrive remarkably well. Timber is only found on the banks of the principal rivers. The pastures are excellent, and the wealth of the inhabitants consists in their flocks and herds. Great numbers of horses and horned cattle run wild on the plains, and large flocks of sheep are kept, the wool of which is of superior quality. Among the wild animals are included the tapir, deer, ounce, monkey, paca, rabbit, and fox; and large packs of wild dogs frequent the plains. There are many kinds of birds, and water fowl frequent the lakes. The manufactures are of little importance, being confined to a few coarse articles for domestic use. The commerce of the country is also comparatively insignificant, few of the natural products finding their way abroad. The exports consist of jerked and salted beef, tallow, hides, horns, and hair; and the imports of manufactured articles, lumber, flour, sugar, cordage, and agricultural implements from the United States. During the year 1858, 936 vessels of an aggregate of 186,699 tons entered, and 922 vessels of an aggregate of 183,230 tons cleared from the ports of the republic. In the same year the value of the exports to the principal countries with which trade is carried on was as follows: Great Britain and her colonies, $1,176,375; France, $1,018,340; Brazil, $981,330; Sardinia, $714,425; United States, $650,115; Spain, $501,700; and Buenos Ayres, $272,840.—In theory the government of Uruguay resembles that of the United States, but in practice it has degenerated into a mere military despotism, and the president, who is usually some successful general, in reality possesses absolute power. According to the budget for 1860, the revenues and expenditures for 18 months were each estimated at $3,579,802. The total public debt in the same year amounted to about $25,000,000.—The territory included in the republic of Uruguay was originally settled by a Spanish colony from Buenos Ayres, but the possession of it afterward caused a war between Spain and Portugal, during which it was in turn several times occupied by both. The contest was finally decided in favor of Spain, and the country attached to the viceroyalty of Buenos Ayres, and known as the district of Banda Oriental. When the war of independence began, Banda Oriental took the side of Buenos Ayres, but shortly afterward separated from that republic. The Brazilians, seeing the country in an unsettled state, and fearing lest its revolutionary doctrines should spread into their territory, took possession of it in 1821. Buenos Ayres protested against this proceeding, but war did not actually break out with Brazil till 1826. A treaty of peace was concluded in 1828, through the intervention of Great Britain, by which the N. part of the country, known as the Seven Missions, was ceded to Brazil, and the S. portion was declared an independent state, under the title of Republica del Uruguay Oriental. Internal dissensions soon broke out, and Rosas, the president of Buenos Ayres, was asked for assistance by Oribe, one of the unsuccessful candidates for the presidency of Uruguay. Some troops were sent, and the war continued for a long time with very little advantage on either side. Brazil, being at last induced to interfere, sent to the governments of England and France to request their help in compelling the combatants to lay down their arms. Both these powers sent some ships of war to the Rio de la Plata in 1845, and blockaded Montevideo, the former till 1848 and the latter till 1849, when they made treaties with the ruler of Buenos Ayres. The Argentine provinces of Corrientes and Entre Rios joined Rosas, and the war continued till 1851, when Oribe was defeated and his patron shortly afterward deposed. Peace was now secured, and treaties were entered into with foreign states, one concluded in Jan. 1859 with Brazil and the Argentine Confederation securing the independence and neutrality of the state; but internal discord still prevailed, and has kept the affairs of the country in a most disorganized condition down to the present time. Bernardo Prudencio Berro is now president, having been elected for 4 years in March, 1860.

URUGUAY, a river of South America, which rises on the W. slope of a range of hills in the N. part of the province of Rio Grande do Sul, Brazil, about lat. 28° S., long. 50° W. After flowing N. W. for about 100 m., it is joined on the right by the Pelotas, by which name it is sometimes known in this part of its course, and then assumes a W. direction until it is joined from the N. by the Repiri, which separates Brazil from the state of Corrientes in the Argentine Confederation. Its course is now S. S. W. for perhaps 250 m., during which it receives the Ibicui, Arapey, and other important affluents, and separates Brazil and Uruguay on the left from the Argentine Confederation on the right. From the town of Belen in Uruguay, at the mouth of the Arroyo-Arapey, its direction is almost due S. for 400 m., when it unites with the Parana to form the Rio de la Plata, in lat. 34° S., long. 61° 40′ W. The most considerable of all its tributaries is the Rio Negro, which joins it from Uruguay, 50 m. above its mouth. Its whole length is 800 m. It is navigable by sailing barks to a point 40 m. below the Ibicui, the N. boundary of the republic of Uruguay. There is here a cataract, above which the river is navigable by large canoes to the mouth of the Pelotas. Its banks are extremely fertile, and produce cotton and maté or Paraguay tea, but they are little cultivated.

USBECKS. See Turks.

USES. The word *usus* was employed in the Roman civil law, and there meant a right to take so much of the fruit or profit of a thing as was needed for sustenance; while *usufructus* had a larger meaning, including a qualified right of possession. In the law of England and the United States, the word use has a precise meaning, which is similar to that of the *fidei commissum* of the Roman law. It means a confidence reposed in one who has the property (or to whom it is given) in possession, that he will hold it for the use or benefit of another, who is called in Norman French the *cestuy que use*. A Roman magistrate (a prætor) was charged with the enforcement of these *fidei commissa*, and was called *commissarius*. When uses became common in England, the chancellor, under whose jurisdiction they passed, had much the same duty to perform as the Roman *commissarius;* and indeed Lord Bacon calls this magistrate a Roman chancellor.—Uses were invented in England to avoid and defeat the statutes of mortmain (see TRUST); and to protect those statutes against uses, the statute of 27 Henry VIII., commonly called the statute of uses, was enacted. This statute provided that any person or corporation entitled to a use in fee simple, fee tail, or otherwise, should stand seized and possessed of the land itself, in the like estate which they had in the use; the intention being to subject a conveyance to the use of any one, and the property and the *cestuy que use*, to the same legal restraints and liabilities as if the conveyance had been made directly to the *cestuy que use*. This statute was said, in legal phraseology, "to execute the use." It was intended to prevent conveyances to use, by making them of no effect where they violated the statutes of mortmain, and of no more effect than a direct conveyance where they did not. Still such uses as the law permitted, or as courts of equity could protect, were found to be exceedingly convenient, and became common; and courts of equity retained their hold upon them, the person to whom the conveyance was made being considered as having the legal estate, subject to the rules of law and the jurisdiction of courts of law, while the *cestuy que use* has an equitable estate subject to the rules and the courts of equity. This is now the prevailing condition of the law of uses in England and in the United States. But the whole system of law and of equity in regard to uses has become as intricate and extensive as it is important. Here we can do no more than indicate the principal rules of this system.—There can be no use, unless: 1, there is a person capable in law of taking it; 2, a person capable in law of being seized of the property to the use of the other; 3, an express declaration of use, or a consideration and a transfer or contract from which the court will imply a use; and 4, sufficient estate or property or interest to sustain a use. Then, if a use exists which the courts can recognize, it is descendible, or heritable, or devisable, or transferable according to the rules of law or equity, in conformity with the provisions in the instrument creating the use. If the *cestuy que use* of land be married, his widow has no dower, nor the husband of a *cestuy que use* a tenancy by courtesy, because the *cestuy que use* has no seisin, nor can he bring an action at law respecting it. The seisin is in the feoffee-to-use, and while his legal estate is subject to all legal incidents at law, equity will subject all these legal incidents to the equitable requirements of the use.—Trusts and uses are often spoken of together, and from the article on TRUSTS their similarity, or analogy, will be seen. They are however different in important particulars; but the rules of law which define this difference are so nice and technical, and still open to so much question, that our space does not permit us to present them with sufficient fulness to be useful.

USHANT (Fr. *Ouessant*), the chief island of a cluster of 7, known collectively as *îles d'Ouessant*, situated about 15 m. from the coast of France, off the W. coast of the department of Finistère, of which they form a canton, and 28 m. W. N. W. from Brest; extreme length 5 m., breadth 3 m.; pop. 2,271. The shores of Ushant are bold and rocky, and landing is only practicable in a few places. The formation is almost entirely granitic, and the soil is fertile, the surface being covered with excellent meadows and pasture lands, upon which horses and sheep are reared. The inhabitants are principally occupied in fishing, and paganism was said to linger among them till the 17th century. The lighthouse on Ushant is situated in lat. 48° 28′ N., long. 5° 3′ W. Off Ushant the British fleet under Sir Edward Hawkes gained a complete victory over the French under Admiral Conflans in 1759; and an indecisive action took place between the English under Admiral Keppel and the French under Count d'Orvilliers in 1778.

USHER (Fr. *huissier*), a public officer having charge of the door of a court or hall, and hence one whose business it is to introduce strangers and perform other similar duties. There are various officers of this kind attached to the royal household in England, including the gentleman usher of the black rod, who attends in the house of peers during the sessions of parliament, and 12 or more gentleman ushers. There is also an usher of the exchequer, who attends the barons and other officers of that court. The term is also applied to an under or assistant master in a school.

USHER, JAMES, an Irish prelate, born in Dublin, Jan. 4, 1580, died in Reigate, Surrey, March 21, 1656. He was educated at Trinity college, Dublin, being one of the first 3 students admitted. He began the study of theology in 1598, took the degree of M.A. in 1600, was ordained priest in 1601, and soon after received the appointment of "Sunday afternoon preacher before the state" in Christ church, Dublin. He was chosen professor of divinity in his college in 1607, and in the same year was made chancellor of the cathedral of St. Patrick. In 1620

King James nominated him to the see of Meath; in 1623 he was made a member of the Irish privy council; and in Jan. 1624, he was raised to the archbishopric of Armagh and the primacy of the Irish church. In 1640 he visited England, and during his absence his house at Armagh was destroyed by the rebels (1641), and with it he lost nearly every thing he possessed. In the state of the country it was thought needless to return to his archbishopric, and Charles I. conferred upon him the bishopric of Carlisle, to be held *in commendam.* In 1647 he was chosen preacher to the society of Lincoln's Inn, and preached regularly in the chapel during term time for nearly 8 years. He was buried in Westminster abbey by order of Cromwell. His principal works are: *De Ecclesiarum Christianarum Successione et Statu* (London, 1618); "Emanuel, or a Treatise on the Incarnation of the Son of God" (Dublin, 1638); *Britannicarum Ecclesiarum Antiquitates* (Dublin, 1639); *De Romanæ Ecclesiæ Symbolo* (London, 1647); *Dissertatio de Macedonum et Asianorum Anno Solari* (1648); *Annales Veteris et Novi Testamenti* (2 vols. fol., 1650–'54); *Epistola ad Ludovicum Capellum de Variantibus Textus Hebraici Lectionibus* (1652); "The Reduction of Episcopacy to the Form of the Synodical Government in the Ancient Church" (1658); and *Chronologia Sacra* (1660). A complete edition of his works has been published by the Dublin university in 17 vols.

USQUEBAUGH (Irish, *uisge*, water, and *bagh*, life), the Irish name for distilled spirit, whence the modern word whiskey. It is now applied to a liquor compounded of brandy, raisins, cinnamon, and other spices.

USUMASINTA RIVER. See GUATEMALA.

USURY. Originally this word meant any taking of money for the use of money; and he was therefore a usurer who, lending money, required in repayment any thing more than the amount which he lent. This was once considered a great moral wrong, and the greater the more was taken. For many ages, however, this opinion, if it has not ceased to exist, has lost much of its practical or legal force. It is no longer deemed more wrong to take pay for the use of money than for the use of a house, or a horse, or any other property. But the lingering influence of the former opinion, together with the fact that the nature of money makes it easier for the lender to oppress the borrower, has caused nearly all Christian nations to fix by law the rate of compensation for the use of money. If compensation be taken within this limitation of law, it is called interest; but if more be taken than the law allows, this is, in the present meaning of the word, usury. (See INTEREST.) The opinion that money should be borrowed and repaid, or bought and sold, upon whatever terms the parties should agree to, like any other property, has of late years gained ground almost everywhere; and where usury laws are in force, this opinion has perhaps exerted some influence upon adjudication. In England, in the reign of Henry VIII., interest at 10 per cent. was made lawful; in the time of James I. it was reduced to 8 per cent.; during the commonwealth it was 6 per cent., and this was again enacted by 12 Charles II.; the statute of 12 Anne reduced it to 5 per cent. The act 3 and 4 William IV. exempted from the operation of the usury laws bills having more than 3 months to run. After several modifications in the reign of Victoria, the act 17 and 18 Victoria, ch. 90, repealed all laws then in force relating to usury; providing only that the rights and remedies of persons in respect to acts previously done, should not be affected by the statute.—In the United States, the usury laws differ in different states, and are not perhaps precisely the same in any two. In Louisiana 5 per cent. is the legal rate; in New York, South Carolina, Georgia, Michigan, Wisconsin, and Minnesota, it is 7 per cent.; in Alabama, Florida, and Texas, 8 per cent.; in California, Kansas, and Oregon, 10 per cent.; in all the other states it is 6 per cent. But the statutes vary exceedingly as to the legal effects of usury. In some, the parties may agree on what rate they will, and the legal rate takes effect only in the absence of agreement; in others, the whole contract is avoided by a reservation or agreement for more than the legal rate. Regarding these as extremes, in much the greater number the penalty for usury lies between them. In some states the legal rate takes effect when there is no agreement, but the parties may agree for more up to a certain definite limit.—There are many ways in which the usury laws may be evaded, and courts watch contracts liable to this abuse with great strictness. Some principles may be gathered from the adjudications, which may be regarded as prevalent, if not universal. Thus, to constitute usury, there must be substantially a loan, and a usurious intent in both parties, in one to give and in the other to take usurious interest. But the contract need not be, in form, a loan; and whether it is so in fact, is a question for a jury. Property may be sold for whatever price the parties agree upon; but if the sale be in fact a mere cover for the usury, it does not protect it. Negotiable paper may be sold like other paper. The cases on this subject are numerous, nice, and perhaps conflicting; but it may be stated as a general rule, that if it is in fact the promissor who sells, and the buyer buys even through an agent, but with knowledge that he buys of the promissor, it is in fact and in law a loan from the buyer, and may therefore be usurious. Even if a statute declares a usurious contract "void," in the most emphatic language, the law looks upon it rather as "voidable;" and therefore no one can make the objection of usury but the borrower and the parties in privity of interest and contract with him. So, if one borrows stock, agreeing to replace it with the dividends received in the mean time, or if he agrees to replace it, or the money it sells for, with interest on its value, the contract is not usurious; but if the lender retains an option to take either the dividends or interest, it is usurious. If a note be given usuriously in payment of or as security for a preëxisting debt, and the note is void by the usury laws, the original debt remains unaffected. As there must be usurious intent, if illegal interest is taken by a miscalculation or other mistake in fact, it is not usury; but it is usury if the mistake be one of law, because every person is held to know the law. If the lender takes upon himself an extra risk (apart from that of the borrower's insolvency), he may charge extra interest. Bottomry and respondentia contracts are founded on this principle, because if the ship or goods are lost, the debt is not demandable. The same principle is applied to the purchase of an annuity, and even to the bargain of the borrower that if he does not repay the principal when due with legal interest, he will pay a certain penalty, because he has the power of avoiding this penalty by payment of interest. If a borrower on repaying the money make the lender a gift, it is usurious if the gift be in performance of a previous promise, but not otherwise. Discount of interest, whereby the lender gets interest on his interest, or interest on money which he never lends, and calculations of interest by Rowlett's tables, which consider the year as consisting of only 360 days (but qualify the error by casting the fractions on the right side), are now established usages, and would not make the contract usurious, especially if the contract were of a kind usually subjected to this usage, as are bank discounts. Compound interest is said, in a recent case (23 Pick. 167), to "savor of usury;" but it may be regarded not so much usury as an agreement to pay a penalty for not paying interest. In the present state of the authorities, it may be said that wherever usury is forbidden, a bargain for compound interest would not be enforced. But it is common for courts to order a settlement of accounts with annual rests, which is equivalent to compound interest. This is especially done where trustees have used the money of their *cestuy que trust*. The prevailing rule for the settlement of accounts on which payments have been made (originating in a decision in Massachusetts) is this: compute the interest on the principal to the first time a payment was made, which payment exceeds, alone or with previous payments, the interest then due; add that interest to the principal; from the sum subtract the payment and preceding payments; the remainder forms a new principal, upon which proceed as before, up to the time of settlement or the rendering of judgment.

UTAH (from the Indian tribe of the same name, commonly spelled Yuta, which signifies "those who dwell in mountains"), a territory of the United States of America, bounded N. by Washington territory, N. E. by Nebraska, E. by Colorado, S. by Arizona (New Mexico), and W. by Nevada, and lying between lat. 37° and 42° N., and long. 109° and 116° W.; area, 131,820 sq. m., or 84,044,880 acres. It was divided in 1860, according to Capt. R. F. Burton ("City of the Saints," 1862), into 19 counties, viz.: Salt Lake, Utah, Davis, Weber, Iron, Tooele, San Pete Valley, Juab, Box Elder,* Washington, Millard, Green River, Cedar,* Malad,* Cache,* Beaver,* Shambip,* Salt Lake Islands,* and St. Mary's.* The largest town is Salt Lake City, Fillmore, the capital, being only a hamlet; and the other county towns are Provo, Farmington, Ogden, Parovan, Tooele, San Pete, Salt Creek, Box Elder, Fort Harmony, Fort Supply, Cedar City, Fort Malad, Cache Valley, Beaver Creek, and Deep Creek. The population of the territory by the U. S. census of 1850 was ascertained to be 11,380, of whom 26 were slaves. In 1856 a census taken by the Mormon authorities returned 37,277 males and 39,058 females, a total of 76,335. The non-Mormon inhabitants, however, maintained that these numbers were purposely exaggerated, and the U. S. commissioners in the following year reported that the population did not exceed 50,000. The U. S. census of 1860 returned 40,295, of whom 29 were slaves. A majority of the people are foreigners, chiefly from Great Britain.—The surface of Utah is an immense basin elevated 4,000 to 5,000 feet above the sea, surrounded on all sides by mountains 8,000 to 10,000 feet high, and subdivided by transverse ridges. The rim of the basin is formed on the N. by the mountains of Oregon, on the E. and S. by sub-ranges of the Rocky mountains, and on the W. by the Sierra Nevada. At some remote period this great basin was evidently an inland sea. The bench formation, a system of water marks, is found in every valley, while detached and parallel blocks of mountain, trending almost invariably N. and S., were in geological ages rock islands rising above the water. Between these primitive and metamorphic ridges lie the secondary basins, whose average width may be 15 or 20 miles. They open into one another by cañons and passes, and are often separated longitudinally by smaller divisions running E. and W., thus converting one extended strip of secondary into a system of tertiary valleys. Two great mountain chains run transversely across the basin from S. E. to S. W. The northernmost is the Humboldt river range, 6,600 feet high; the southern is the prolongation of the Wahsatch range, which has an elevation of nearly 12,000 feet. The watershed of the basin is toward the N., S., E., and W., chiefly through the affluents of the Columbia and the Colorado. Lakes are numerous, two nearly parallel chains of them extending across the country from N. to S. The eastern chain begins at the north with the Great Salt lake (see Great Salt Lake), the small lakes of the Wahsatch, the Utah, the

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* These counties are not contained in the U. S. census returns for 1860; while three returned by the census, Carson, Deseret, and Summit, are not named by Burton.

Nicollet, and the Little Salt lake. All these are fed by the streams that flow from the western counterslope of the Wahsatch mountains. The other chain consists of Mud, Pyramid (so called from a pyramidal rock rising from its waters), Carson, Monò, and Walker's lakes, which receive the waters flowing from the eastern slope of the Sierra Nevada. There are many thermal springs in the territory, some of which discharge strong brine, some are sulphurous, and others chalybeate.—The rocks of Utah are mostly primitive—granite, jasper, syenite, hornblende, and porphyry, with various quartzes. Volcanic action is indicated by the presence of obsidian, scoriæ, and lava. Many of the ridges are of carboniferous limestone mingled with calcareous spar, and resting upon or alternating with hard and compact grits and sandstone, and in many places rich with encrinites and fossil corallines. In the cañons near Salt Lake City are found bowlders of serpentine; fine gray granite; coarse red, ochrish, poikilitic, crystalline white, and metamorphic sandstones; a variety of conglomerates, especially granitic, with tufa in large masses; talcose and striated slates, gypsum, pebbles of alabaster, and various kinds of limestone. Marble of every hue and texture is found in large masses. Iron of excellent quality is abundant, and gold, silver, copper, lead, and zinc have been found. Bituminous coal exists in inexhaustible quantities, as also sulphur and saleratus; and alum, borax, and petroleum have been discovered. Among the precious stones that have been found are rubies, emeralds, chalcedony, sardonyx, carnelian, and agates.—Among the native animals are the antelope, deer, elk, bighorn or Rocky mountain sheep, the cougar, the catamount, the large and small wolf, the red, great-tailed, and silver fox, minks, ermines, skunks, badgers, wolverenes, beavers, hares, the jackass rabbit, porcupines, gophers, woodchucks, squirrels, and the hyrax, or as the Mormons call it the cony. The principal birds of prey are the red-tailed hawk, the sharp-shinned hawk, the sparrow hawk, and the vulturine turkey buzzard. There are several varieties of quail and grouse; and among the water fowl are swans, wild geese, the white pelican, the cormorant, the mallard or green-head, the red-breasted and green-winged teal, the brant, the plover and curlew, the gull, a blue heron, and a brown crane. There are also the blue bird, the humming bird, finches, woodpeckers, the swamp blackbird, the snow bird, and a species of lark which is considered a delicacy for the table. Among the reptiles are a gray and green lizard and the *phrynosoma* or horned frog, of which there are many species. The serpents are chiefly rattlesnakes, swamp adders, and water snakes. The fishes are perch, pike, bass, chub, trout, and salmon trout, the last of which sometimes reaches the weight of 30 lbs.—The vegetation of Utah is not luxuriant. Timber is scarce except on the mountains, where there are extensive forests of pine and fir. The lower cañons and river bottoms produce willows, scrub maple, box elder, aspen, birch, cottonwood, and in the southern part of the territory spruce and dwarf ash. There is an inconvenient deficiency of hard wood and of wood fit for building, though extensive plantations have been made which promise a sufficient supply in the future. Among the peculiar natural products is a fine bunch grass, which lives and grows through the winter and furnishes food for cattle at all seasons. The wild fruits are the service berry, chokeberry, buffalo berry, gooseberry, strawberry, and black, white, red, and yellow mountain currant.—The great elevation of Utah above the sea and the immense masses of snow-covered mountains that surround it exercise a material effect upon the climate. The air is highly rarified, so that new comers suffer from difficulty of breathing, and after violent exercise experience nausea and fainting. The weather is changeable, and during much of the year is very bleak. In 1860 the highest range of the thermometer was 96° in July, and the lowest 22° below zero in December. Spring opens in the valleys with great suddenness, and the summer is hot, though the mornings and evenings are usually cooled by breezes from the mountains. Thunder storms and dust storms are frequent and violent. The winter is severe, with high winds and deep snows, which lie in the cañons throughout the year.—The Indians of Utah are chiefly of the Shoshonee or Snake nation, and of the Yuta or Ute race, as they are commonly called by the whites. The Shoshonees comprise 14 tribes, averaging nearly 1,000 souls each. The Yuta are divided into 27 bands, and are estimated to number 15,000 souls. Many of their bands however roam beyond the bounds of Utah, and the whole nation is thought to be diminishing. Of late years they have been hostile to the whites, and have lost many of their fighting men in encounters with the emigrants crossing the plains to California, and with the U. S. regular forces. Of the white inhabitants of Utah, nearly all are Mormons or "Latter Day Saints," the majority of whom are of European birth, chiefly English. The character of these people, among whom polygamy is extensively practised, has been very differently represented by different observers. By most of the travellers who have written concerning them they have been described as intolerant, ignorant, immoral, and coarse, with little regard for the rights of the "Gentile" or non-Mormon part of their neighbors. On the other hand, Capt. Burton, the English traveller, who spent 24 days among them in 1860, and is an apologist for polygamy, says that "in point of mere morality the Mormon community is perhaps purer than any other of equal numbers," and ascribes to them tolerance, kindness, sobriety, industry, and many other good qualities. The influence of the priesthood is very strongly felt in all civil and social matters among the Mormons, and is exercised through a complicated and imposing or ganization of presidents, bishops, elders, quorums, and councils. A regular system of tithing has been instituted, by which one tenth of the grain, beef, pork, butter, and other products of labor is given by the people to the church. There is a tithing office at Salt Lake City, in which the goods thus contributed are received and stored, and in which accounts are kept with every member of the church. The amount of the produce of each is carefully ascertained, and he is charged with one tenth of every thing, including his labor, and credited with what he pays. Branch offices are kept at the principal villages and settlements, from which reports are made.—The soil of Utah is in general hard, dry, and barren. Not more than one fiftieth part is fit for tillage, though in some places extraordinarily large crops have been raised. It is said indeed that land near Lake Utah has yielded from 60 to 100 bushels per acre. The principal crops are wheat, buckwheat, oats, barley, Indian corn, all the fruits and vegetables of the temperate zone, and flax, hemp, and linseed in abundance. The warmest and most fertile lands are on the benches above the lower valleys. The alkaline nature of the soil is injurious to vegetation, though potatoes, squashes, and melons are made sweeter by a small admixture of it. A species of cricket, and a grasshopper about the size of a common locust, are also very troublesome to the farmer. The difficulties which beset agriculture do not extend to grazing, for which the country is admirably adapted. The valleys supply plentiful pasturage in the winter, and as spring advances, and the snow disappears on the hills, the flocks and herds find ample forage on the bunch grass, which bears its seed in summer. In the basin of Green river is a fine wool-producing region nearly as large as Massachusetts, and the best breeds of sheep have already been introduced into the territory. In 1860 the valley of the Great Salt lake produced 806,000 bushels of grain, chiefly wheat, which thrives better than maize, the summers being scarcely long enough for the latter grain.—The manufactures comprise farming implements, agricultural and other machines, steam engines, leather, woollen and cotton goods, dye stuffs, furniture, cutlery, hardware, jewelry, and brushes. These works are carried on for the most part by skilful English artisans. There are some distilleries and 8 or 10 breweries, in which beer is made from wild hops. The great distance of Utah, both on the east and the west, from the settled parts of the country, and the difficulties of transportation over the mountains, render almost every article of commerce not produced in the territory itself exorbitantly dear. Groceries and clothing are particularly high-priced. Sugar is worth from 37½ to 40 cents per pound, coffee 50 cents, and tobacco $1.—Education is superintended by a chancellor and board of regents of the "university of the state of Deseret." Common schools are established in each ward of Salt Lake City. There are also various institutions of a higher order, of which the most flourishing is an academy founded in April, 1860, in which science and art are to be taught gratis to all who pledge themselves to learn thoroughly, and to benefit the territory by their exertions. There are two weekly newspapers in the territory, of which the "Deseret News," established in 1850, is the recognized organ of the church. The other is a secular paper called "The Mountaineer."—Utah is organized like the other territories of the United States, with a governor, secretary, marshal, and judges appointed by the president, and a legislative assembly elected by the people. Legislative action is not dissimilar from that of other territories, except that no punishment is affixed to bigamy. There was no national law against this offence until 1862, when congress passed an act "to punish and prevent the practice of polygamy in the territories of the United States and other places, and disapproving and annulling certain acts of the legislative assembly of the territory of Utah."—For the history of Utah, see MORMONS. The inhabitants of the territory have recently adopted a constitution and government under the title of the state of Deseret, and their senators and representatives in June, 1862, unsuccessfully applied to congress for admission.

UTAH, an E. co. of Utah territory, bordering on Colorado territory, and drained by White, Green, and Uinta rivers; area, about 4,000 sq. m.; pop. in 1850, 2,026. Utah lake, 40 m. long and from 5 to 12 m. wide, lies in the W. part, which is also traversed by the Wahsatch mountains. Most of the surface is hilly. The soil in the valleys is productive, and in the hilly parts sterile. Capital, Provo.

UTICA, a city and one of the capitals of Oneida co., N. Y., situated on the Mohawk river, and at the junction of the New York central and Utica and Black River railroads, and of the Erie and Chenango canals, 95 m. W. N. W. from Albany, and 56 m. E. from Syracuse; pop. in 1860, 22,528. The city lies on the S. side of the Mohawk, and is regularly laid out; it rises gradually from the river to the height of 150 feet at the head of Genesee street. This street has the principal shops and many elegant private residences. The city hall on this street, erected about 1852, is of Milwaukee brick, and contains beside the city offices a court room for the U. S. district court, and a commodious public hall. The city is lighted by gas, is well supplied with water, and has a very efficient fire department. It has 6 large and several smaller hotels; 4 banks, with an aggregate capital of $1,810,200, and 2 savings banks; a cotton mill, employing 350 hands, consuming 3,000 bales of cotton, and producing 3,400,000 yards of cotton cloth annually; 2 woollen factories, employing 480 hands, and consuming nearly 900,000 lbs. of wool annually; a millstone and plaster mill, producing about $60,000 worth annually; and numerous manufactories of starch, flour, ale, clothing, organs, pianos, castings, machinery, carriages, boats, stone wares, fire brick, carpets, oil cloths, &c. There are 24 churches, viz.: 4 Baptist, 3 Methodist Episcopal, 3 Protestant Episcopal, 3 Roman Catholic, 2 Presbyterian, and 1 each Evangelical, Evangelical Lutheran, Calvinistic Methodist, Reformed Dutch, German Methodist, Wesleyan Methodist, Old School Baptist, and Universalist, and a Jewish synagogue. There are 11 newspapers and periodicals published in the city, of which 3 are daily and weekly, 4 weekly, 3 monthly, and 1 quarterly. Two of the newspapers are Welsh and one German. The public schools are graded, and in 1861 employed 7 male and 38 female teachers, and were attended by 3,108 pupils. The total expenditure was $22,745. The number of volumes in the district school libraries was 3,018. There were beside these 10 private schools, the Utica female academy, a flourishing institution founded in 1837, and the academy of the Assumption, under the care of the brothers of the Christian schools. Utica is the seat of the state lunatic asylum, one of the largest insane hospitals in the United Sates, which on Nov. 30, 1861, had 382 patients. The asylum occupies a farm of 130 acres, and the cost of the buildings has been upward of $500,000. There are also a Catholic and a Protestant orphan asylum; the former, under the care of the sisters of charity, maintains from 50 to 90 orphans, and the latter, incorporated and endowed, from 75 to 100.—The site of the city was included in the colonial grant styled Cosby's manor, made in 1734; but there was no settlement till after the revolution. In 1787 there were 3 log huts in the place. Fort Schuyler had been erected between the present Main and Mohawk streets, below Second street, in 1758, and occupied as a military post, and a blockhouse was built before the close of the revolutionary war on the site of the present railroad depot. In 1813 it had 1,700 inhabitants, and it grew very slowly till after the completion of the Erie canal.

UTICA, an ancient city of Africa, situated on the W. arm of the river Bagradas, near the bay of Carthage, a little N. W. of the present city of Tunis; its site is now occupied by the little village of Duar. It was founded by the Tyrians, 287 years before the foundation of Carthage. In the early wars between Rome and Carthage it appears as an ally of the latter. In the 3d Punic war it made a separate and early submission to Rome, and its prosperity was thereby greatly increased, as on the fall of Carthage a part of its territory was given to Utica, and that city made the capital of the colony and the residence of the Roman governor. In the historical narratives of the struggles between Sylla and Marius, and those between Cæsar and Pompey, frequent references are made to it as a place of great importance. Its temples and statues; its amphitheatre, capable of seating 20,000 persons, and where on an artificial lake mimic sea fights were exhibited; its aqueduct, bringing water from hills several miles distant, and carrying it by triple arches over the ravines; its numerous vast reservoirs, or cisterns, some of which still remaining are 136 feet long, 19 wide, and 20 or 30 deep, all indicate its magnificence in the period of its greatness. Cato the younger, surnamed Uticensis, committed suicide here in 46 B. C. Augustus made it a free city. Hadrian persuaded the inhabitants to become a Roman colony. Septimius Severus bestowed upon it the *jus Italicum*. It was the see of a Christian bishop at an early date. It fell into the hands of the Vandals in 439, but was recovered by the Byzantine emperors, who retained it till the reign of the caliph Abd-el-Malek, when it was conquered by the Arabians, and was destroyed about the close of the 7th century.

UTOPIA (Gr. ου, not, and τοπος, a place), the title of a political romance by Sir Thomas More, and the name that he gave to an imaginary island, which he represents to have been discovered by a companion of Amerigo Vespucci, and in which existed a perfect society. He pictured a community where all the property belonged to the government, to which every one contributed by his labor, receiving therefrom a supply of his wants; where the citizen rose through all the gradations of his existence from form to form, as if in a vast public school; where gold was contemned, and all the members of the society, unswerved by passion, were fixed each in his proper place. The "Utopia" of More was published in Latin in 1516, and was translated into English by Bishop Burnet. The name is applied to all narratives of an imaginary perfect society, as the republic of Plato, the solar city of Campanella, the "Oceana" of Harrington, the floating isles of Morelli, and the happy nation of Felicians of Mercier de la Rivière; and also to socialist speculations like those of Babeuf, Saint Simon, and Fourier.

UTRECHT, a province of Holland, bounded N. by North Holland and the Zuyder Zee, E., S., and W. by Gelderland and South Holland; area, 534 sq. m.; pop. in 1860, 161,164. The chief towns are Utrecht, the capital, Amersfoort, Rhenen, Wyk, Montfoort, and Ysselstein. The surface is level in the N. and W., and varied in the S. E. by some low hills. It is well watered by the Rhine, and its branches the Vecht and Amstel. The air is not so damp as in other parts of Holland, and the climate is generally healthy. In the more elevated parts of the province the soil is sandy, and is covered by extensive heaths and tracts of peat moors; but the low ground is remarkably rich and fertile.—UTRECHT, the capital, is situated on the Old Rhine, at the bifurcation of the Vecht, in lat. 52° 7′ N., long. 5° 6′ E., 22 m. S. E. from Amsterdam; pop. in 1859, 53,083. The site is comparatively elevated, and the town is traversed by 2 canals which are crossed by numerous stone bridges. It is of oval shape, about 3 m. in circuit, and was formerly surrounded by walls, but these have been removed and the ground occupied by beautiful walks, outside of which is the Maliebaan, a promenade and carriage way planted with several rows of shade trees, and bordered by fine gardens. The most remarkable building is the ancient cathedral, erected in 1382 and now in a dilapidated state. It has a detached tower, said to be 388 feet in height. There are several other churches, 3 of which belong to the Jansenists, who have their chief establishment here. The old town hall contains the room in which the first confederation of the Dutch provinces assembled in 1579; and another where many of the preliminaries of the peace of 1713 between the allies and the French were agreed to. The university is a plain building, but contains a valuable library of 50,000 volumes, a museum, an anatomical hall, and a laboratory, and has an observatory and botanic garden. It was founded in 1636, has 22 professors, and in 1858–'9 had 469 students. There are numerous schools. The manufactures include cotton, linen, silk, woollen cloth, carpets, plush or "Utrecht velvet," leather, &c.

UVALDE, a new S. W. co. of Texas, bounded W. by the Nueces river, and drained by the Rio Frio and its affluents; area, 1,480 sq. m.; pop. in 1860, 506, of whom 27 were slaves. About two thirds of the county is prairie land. The soil is very productive. Sheep and goats are raised extensively. Capital, Uvalde.

UVAROFF, Sergei, a Russian statesman and author, born in St. Petersburg about 1798, died in 1855. He held various important offices under government, and became in 1818 president of the St. Petersburg academy of sciences, and subsequently curator of the university of the same city. He was created a count in 1836. He wrote in French an *Essai d'une académie Asiatique* (1810); *Essai sur les mystères d'Éleusis* (St. Petersburg, 1812); *De l'empereur Alexandre et de Bonaparte* (Brunswick, 1815); and *Esquisses politiques et littéraires* (Paris, 1848); and in German, "The Poet Nonnus of Panopolis" (1817); "Studies on the Ante-Homeric Era" (1821); and "Remarks upon Goethe" (1833).—His son Alexei published at St. Petersburg in 1852 a volume of travels along the N. shore of the Black sea.

UVULA, the conical fleshy appendage, hanging down toward the tongue from the border of the soft palate, on the median line. It is made up of muscular substance, covered by mucous membrane; from it arise on each side two folds, called the pillars of the fauces, between which, on the back part and sides of the throat, are the tonsils. It varies in size and length in different individuals, but is generally ½ to ¾ of an inch long; it is sometimes so long as to rest upon the tongue, causing harassing cough from its continued tickling, requiring the use of astringent gargles or even a partial excision; it is occasionally bifid at the tip.

UWINS, Thomas, an English painter, born in London in 1783, died Aug. 25, 1857. In early life he was much employed in designing for illustrated works, and making water color copies of paintings for the use of engravers; but subsequent to 1826, when he visited southern Europe for the benefit of his health, he painted a numerous and popular series of pictures illustrating the social life of the Italian peasantry. He also painted English and French peasant pieces, and somewhat later illustrations from popular authors and from sacred and profane history. His historical pictures are his least successful productions. In 1836 he was elected a royal academician; and for several years he was keeper of her majesty's pictures and of the national gallery.

UZZIAH, or Azariah, a king of Judah. See Hebrews, vol. ix. pp. 84, 85.

END OF VOLUME FIFTEENTH.